HP ProLiant DL385 Server
User Guide

March 2005 (Second Edition)
Part Number 376536-002

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Audience assumptions

This document is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

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Server component identification

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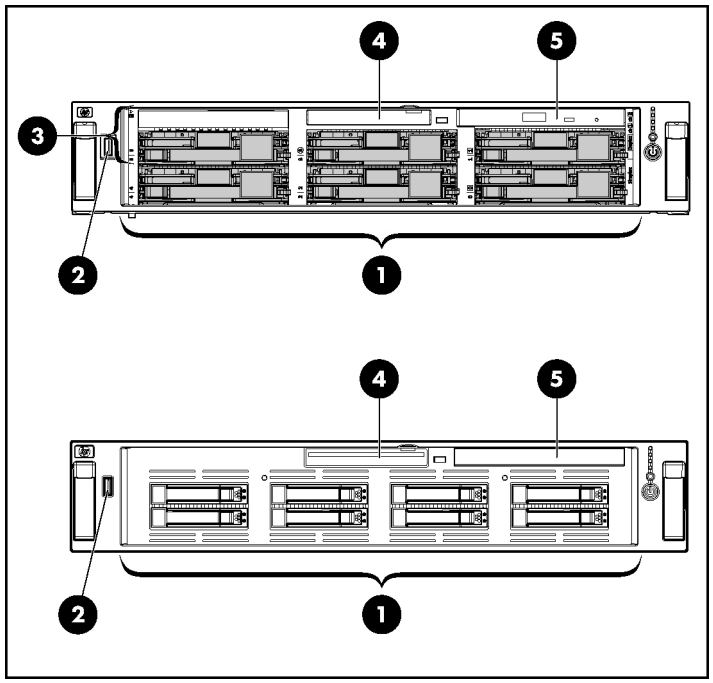
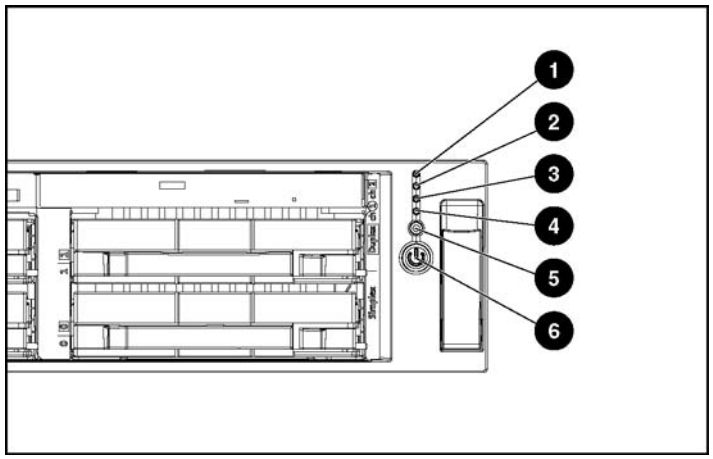
Front panel components



Item	SCSI model (top)	SAS model (bottom)
1	Hard drive bays	Hard drive bays
2	USB port	USB port
3	Bay for tape drive or hard drive with tape drive blank	—
4	Diskette drive bay	Diskette drive bay
5	DVD/CD-ROM drive	DVD/CD-ROM drive

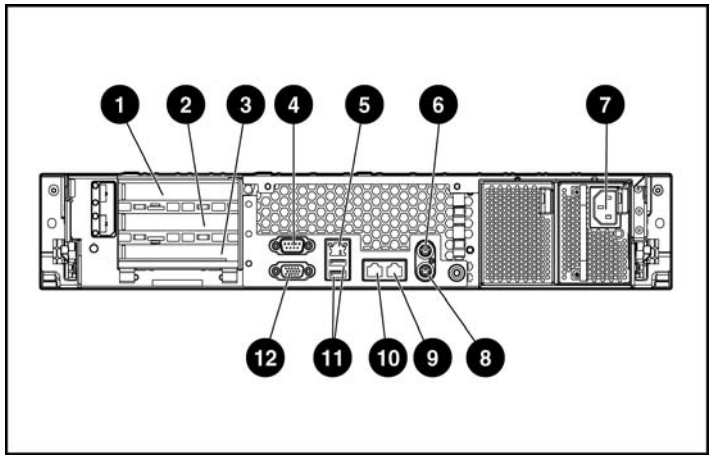
Front panel LEDs and buttons



Item	Description	Status
1	Internal health LED	Green = Normal Amber (flashing) = System degraded. Refer to system board LEDs to identify component in degraded state. Red (flashing) = System critical. Refer to system board LEDs to identify component in critical state.
2	External health LED (power supply)	Green = Normal Amber (flashing) = Power redundancy failure Red (flashing) = Critical power supply failure
3	NIC 1 link/activity LED	Green = Network link Green (flashing) = Network link and activity Off = No link to network. If power is off, view the rear panel RJ-45 LEDs for status.
4	NIC 2 link/activity LED	Green = Network link Green (flashing) = Network link and activity Off = No link to network. If power is off, view the rear panel RJ-45 LEDs for status.

Item	Description	Status
5	UID LED button	Blue = Activated Blue (flashing) = System being remotely managed Off = Deactivated
6	Power On/Standby button/system power LED	Green = System on Amber = System shut down, but power still applied Off = Power cord not attached or power supply failure

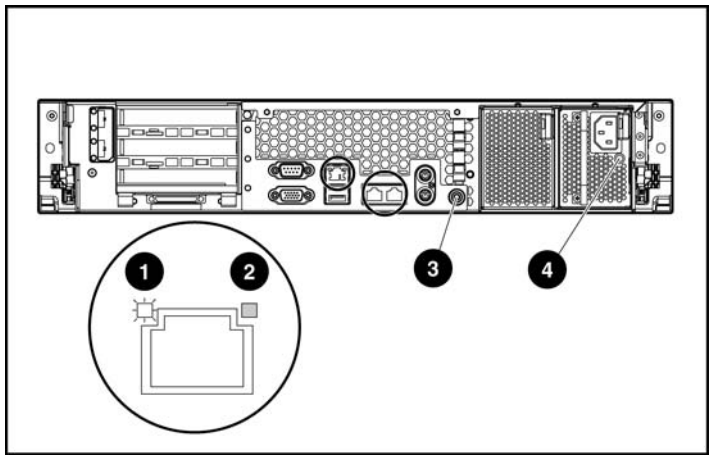
Rear panel components



Item	Description	Connector Color
1	PCI-X expansion slot 1, 64 bit/100 MHz, Bus A	N/A
2	PCI-X expansion slot 2, 64 bit/100 MHz, Bus A	N/A
3	PCI-X expansion slot 3, 64 bit/133 MHz, Bus B	N/A
4	Serial connector	Teal
5	iLO connector	N/A
6	Mouse connector	Green

Item	Description	Connector Color
7	Power cord connector	N/A
8	Keyboard connector	Purple
9	NIC 1 connector	N/A
10	NIC 2 connector	N/A
11	USB connectors (2)	Black
12	Video connector	Blue

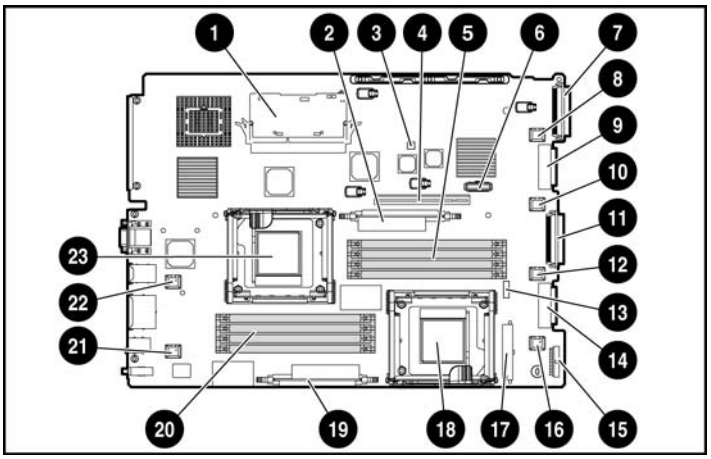
Rear panel LEDs and buttons



Item	Description	LED Color	Status
1	RJ-45 activity LED	Green	On or flashing = Network activity Off = No network activity
2	RJ-45 link LED	Green	On = Linked to network Off = Not linked to network

Item	Description	LED Color	Status
3	UID LED button	Blue	On = Activated Flashing = System remotely managed Off = Deactivated
4	Power supply LED	Green	On = Power turned on and power supply functioning properly Off = One or more of the following conditions exists: • AC power unavailable • Power supply failed • Power supply in standby mode • Power supply exceeded current limit

System board components



Item	Description
1	Smart Array 6i Cache Module option
2	PPM for processor 1
3	NMI header

Item	Description
4	PCI riser cage connector
5	DIMM slots (5-8)
6	Remote management connector
7	SCSI connector (port 2) *
8	Fan connector
9	DVD/CD-ROM drive system connector
10	Fan connector
11	SCSI connector (port 1) *
12	Fan connector
13	System maintenance switch
14	Diskette drive system connector
15	Power supply signal connector
16	Fan connector
17	System power connector
18	Processor socket 2
19	PPM for processor 2
20	DIMM slots (1-4)
21	Fan connector
22	Fan connector
23	Processor socket 1

*This feature applies only to SCSI models.

System maintenance switch

Position	Default	Function
S1	Off	Off = iLO security is enabled. On = iLO security is disabled.

Position	Default	Function
S2	Off	Off = System configuration can be changed. On = System configuration is locked.
S3	Off	Reserved
S4	Off	Reserved
S5	Off	Off = No function On = Clears power-on password and administrator password
S6	Off	Off = No function On = Clear NVRAM.
S7	Off	Reserved
S8	Off	Reserved

When the system maintenance switch position 6 is set to the On position, the system is prepared to erase all system configuration settings from both CMOS and NVRAM.

CAUTION: Clearing CMOS and/or NVRAM deletes configuration information. Be sure to properly configure the server or data loss could occur.

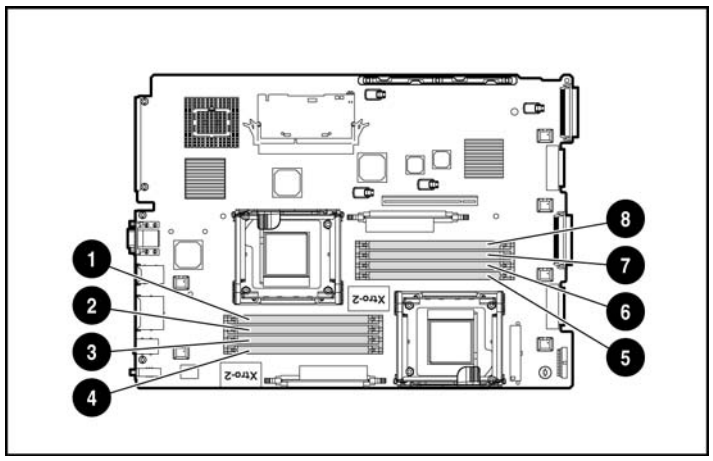
NMI jumper

The NMI jumper allows administrators to perform a memory dump before performing a hard reset. Crash dump analysis is an essential part of eliminating reliability problems, such as hangs or crashes in OSs, device drivers, and applications. Many crashes can freeze a system, requiring you to do a hard reset. Resetting the system erases any information that would support root cause analysis.

Systems running Microsoft® Windows® experience a blue-screen trap when the OS crashes. When this happens, Microsoft® recommends that system administrators perform an NMI event by temporarily shorting the NMI header with a jumper. The NMI event enables a hung system to become responsive again.

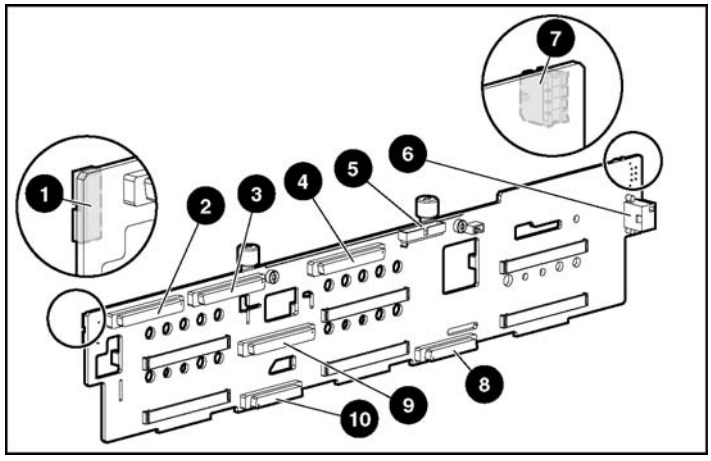
DIMM slots

DIMM slots are numbered sequentially (1 through 8) and the paired banks are identified by the letters A, B, C, and D.



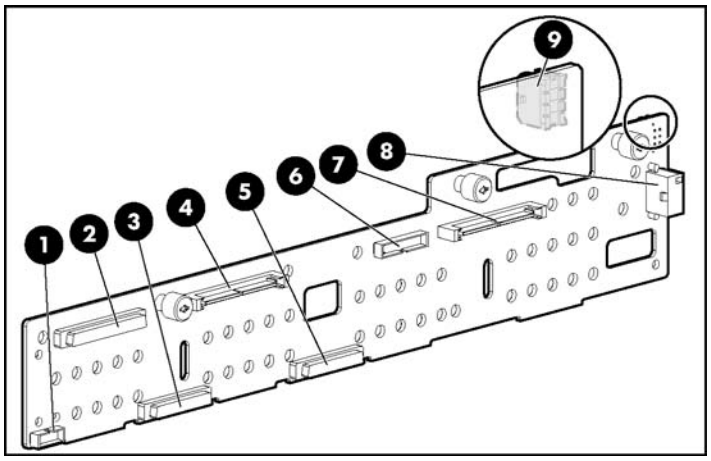
Item	Description
1	DIMM slot 1A
2	DIMM slot 2A
3	DIMM slot 3B
4	DIMM slot 4B
5	DIMM slot 5C
6	DIMM slot 6C
7	DIMM slot 7D
8	DIMM slot 8D

SCSI backplane components



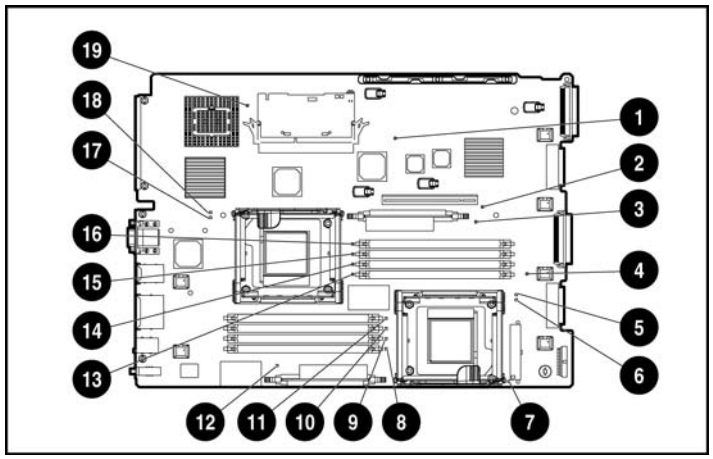
Item	Description
1	Power button/LED connector
2	SCSI connector (port 2)
3	DVD/CD-ROM drive connector
4	SCSI connector (port 1)
5	Diskette drive connector
6	Power connector
7	USB connector
8	Diskette drive system connector
9	SCSI connector (used with a jumper cable in simplex mode or terminator board in duplex mode)
10	DVD/CD-ROM drive system connector

SAS backplane components



Item	Description
1	Power button/ LED connector
2	DVD/CD-ROM drive connector
3	DVD/CD-ROM drive system connector
4	SAS connector
5	Diskette drive system connector
6	Diskette drive connector
7	SAS connector
8	Power connector
9	USB connector

System board LEDs



Item	LED Description	Status
1	Power good	Green = Normal Off = Power failure
2	Riser interlock	Amber = PCI riser cage not seated Off = PCI riser cage is seated
3	PPM 1 failure	Amber = PPM failure Off = Normal
4	System overtemperature	Amber = Cautionary or critical temperature level detected Off = Temperature OK
5	Processor 2 overtemperature	Amber = Cautionary or critical temperature level detected Off = Temperature OK
6	Processor 2 failure	Amber = Processor failure Off = Normal
7	Auxiliary power good	Green = Normal Off = Power failed

Item	LED Description	Status
8	DIMM 4B failure	Amber = Memory failure Off = Normal
9	DIMM 3B failure	Amber = Memory failure Off = Normal
10	DIMM 2A failure	Amber = Memory failure Off = Normal
11	DIMM 1A failure	Amber = Memory failure Off = Normal
12	PPM 2 failure	Amber = PPM failure Off = Normal
12	DIMM 5C failure	Amber = Memory failure Off = Normal
13	DIMM 6C failure	Amber = Memory failure Off = Normal
14	DIMM 7D failure	Amber = Memory failure Off = Normal
15	DIMM 8D failure	Amber = Memory failure Off = Normal
16	Processor 1 failure	Amber = Processor failure Off = Normal
17	Processor 1 overtemperature	Amber = Cautionary or critical temperature level detected Off = Temperature OK
18	SCSI failure*	Amber = SCSI interface failure Off = Normal

*This feature applies only to SCSI models.

System LEDs and internal health LED combinations

When the internal health LED on the front panel illuminates either amber or red, the server is experiencing a health event. Combinations of illuminated system LEDs and the internal health LED indicate system status.

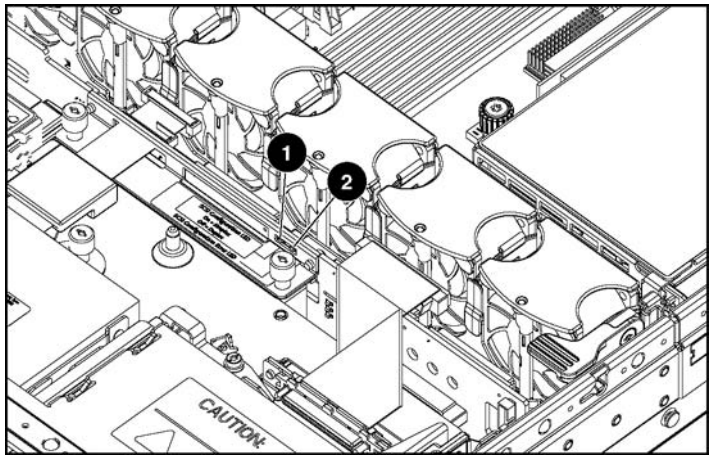
The front panel health LEDs indicate only the current hardware status. In some situations, HP SIM ("HP Systems Insight Manager" on page 113) may report server status differently than the health LEDs because the software tracks more system attributes.

System LED and Color	Internal Health LED Color	Status
Processor failure, socket *X* (amber)	Red (flashing)	One or more of the following conditions may exist: • Processor in socket *X* has failed. • Processor *X* is not installed in the socket. • Processor *X* is unsupported. • ROM detects a failed processor during POST.
	Amber (flashing)	Processor in socket *X* is in a pre-failure condition.
PPM failure, slot *X* (amber)	Red (flashing)	• PPM in slot *X* has failed. • PPM is not installed in slot *X*, but the corresponding processor is installed.
DIMM failure, slot *X* (amber)	Red (flashing)	• DIMM in slot *X* has failed.
	Amber (flashing)	• DIMM in slot *X* is in a pre-failure condition.
DIMM failure, all slots in one bank (amber)	Red (flashing)	No valid or usable memory is installed in the system.
Overtemperature (amber)	Red (flashing)	• The Health Driver has detected a cautionary temperature level. • The server has detected a hardware critical temperature level.
Riser interlock (amber)	Red (flashing)	PCI riser cage is not seated.
Power converter module (amber)	Red (flashing)	Power converter module has failed.

System LED and Color	Internal Health LED Color	Status
Fan (amber)	Amber (flashing)	Redundant fan has failed.
	Red (flashing)	The minimum fan requirements are not being met. One or more fans have failed or are missing.
SCSI configuration error (amber) *	Red (flashing)	SCSI cabling or terminator configuration is incorrect for SCSI backplane.

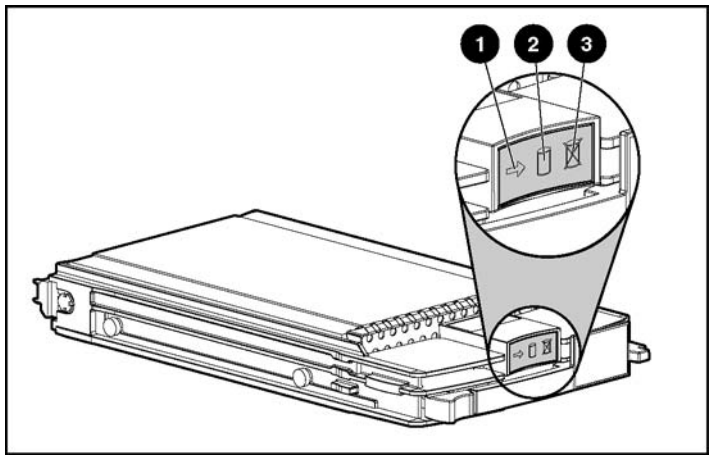
*This feature applies only to SCSI models.

SCSI backplane LEDs



Item	LED Description	Status
1	SCSI configuration	On = Simplex Off = Duplex
2	SCSI configuration error	On = SCSI cabling or terminator configuration is incorrect Off = SCSI cabling or terminator configuration is correct

Hot-plug SCSI hard drive LEDs

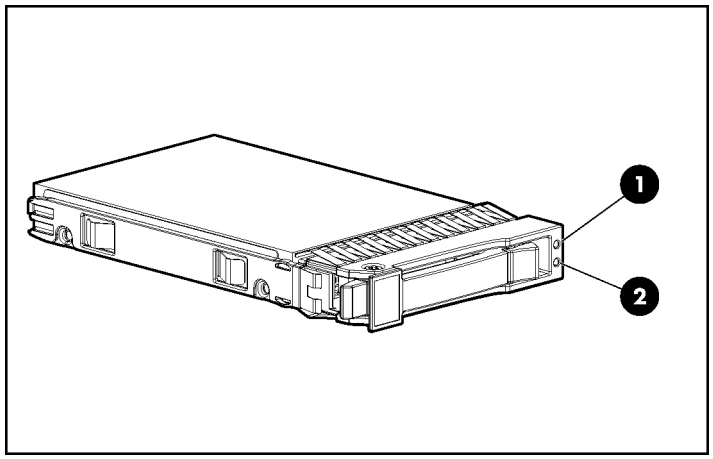


Item	LED description	Status
1	Activity status	On = Drive activity Flashing = High activity on the drive or drive is being configured as part of an array. Off = No drive activity
2	Online status	On = Drive is part of an array and is currently working. Flashing = Drive is actively online. Off = Drive is offline.
3	Fault status	On = Drive failure Flashing = Fault-process activity Off = No fault-process activity

Hot-plug SCSI hard drive LED combinations

Activity LED (1)	Online LED (2)	Fault LED (3)	Interpretation
On, off, or flashing	On or off	Flashing	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
On, off, or flashing	On	Off	The drive is online and is configured as part of an array. If the array is configured for fault tolerance and all other drives in the array are online, and a predictive failure alert is received or a drive capacity upgrade is in progress, you may replace the drive online.
On or flashing	Flashing	Off	**Do not remove the drive. Removing a drive may terminate the current operation and cause data loss.** The drive is rebuilding or undergoing capacity expansion.
On	Off	Off	**Do not remove the drive.** The drive is being accessed, but (1) it is not configured as part of an array; (2) it is a replacement drive and rebuild has not yet started; or (3) it is spinning up during the POST sequence.
Flashing	Flashing	Flashing	**Do not remove the drive. Removing a drive may cause data loss in non-fault-tolerant configurations.** Either (1) the drive is part of an array being selected by an array configuration utility; (2) Drive Identification has been selected in HP SIM; or (3) drive firmware is being updated.
Off	Off	On	The drive has failed and has been placed offline. You may replace the drive.
Off	Off	Off	Either (1) the drive is not configured as part of an array; (2) the drive is configured as part of an array, but it is a replacement drive that is not being accessed or being rebuilt yet; or (3) the drive is configured as an online spare. If the drive is connected to an array controller, you may replace the drive online.

Hot-plug SAS hard drive LEDs



Item	Description
1	Online LED (green)
2	Fault/UID LED (amber/blue)

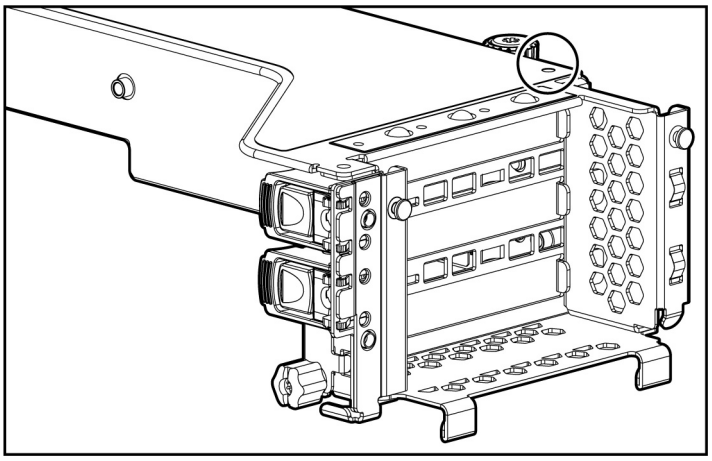
Hot-plug SAS hard drive LED combinations

Online/Activity LED (green)	Fault/UID LED (amber/blue)	Interpretation
On, off, or flashing	Alternating amber and blue	The drive has failed, or a predictive failure alert has been received for this drive; it also has been selected by a management application.
On, off, or flashing	Steadily blue	The drive is operating normally, and it has been selected by a management application.
On	Amber, flashing regularly (1 Hz)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
On	Off	The drive is online, but it is not active currently.

Online/Activity LED (green)	Fault/UID LED (amber/blue)	Interpretation
Flashing regularly (1 Hz)	Amber, flashing regularly (1 Hz)	**Do not remove the drive. Removing a drive may terminate the current operation and cause data loss.** The drive is part of an array that is undergoing capacity expansion or stripe migration, but a predictive failure alert has been received for this drive. To minimize the risk of data loss, do not replace the drive until the expansion or migration is complete.
Flashing regularly (1 Hz)	Off	**Do not remove the drive. Removing a drive may terminate the current operation and cause data loss.** The drive is rebuilding, or it is part of an array that is undergoing capacity expansion or stripe migration.
Flashing irregularly	Amber, flashing regularly (1 Hz)	The drive is active, but a predictive failure alert has been received for this drive. Replace the drive as soon as possible.
Flashing irregularly	Off	The drive is active, and it is operating normally.
Off	Steadily amber	A critical fault condition has been identified for this drive, and the controller has placed it offline. Replace the drive as soon as possible.
Off	Amber, flashing regularly (1 Hz)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
Off	Off	The drive is offline, a spare, or not configured as part of an array.

PCI riser cage LED

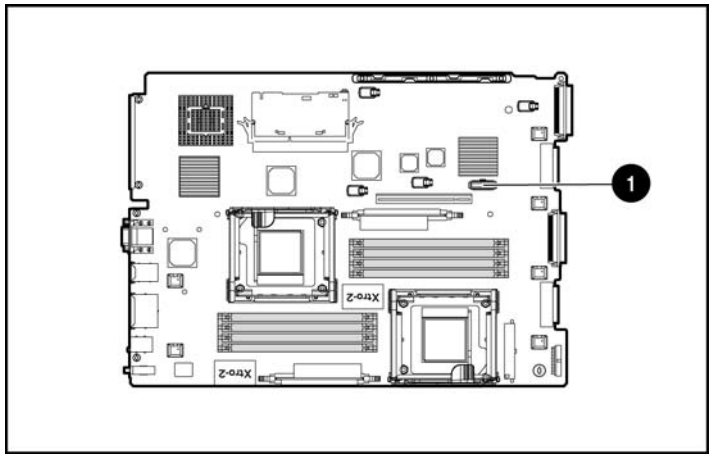
CAUTION: To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.



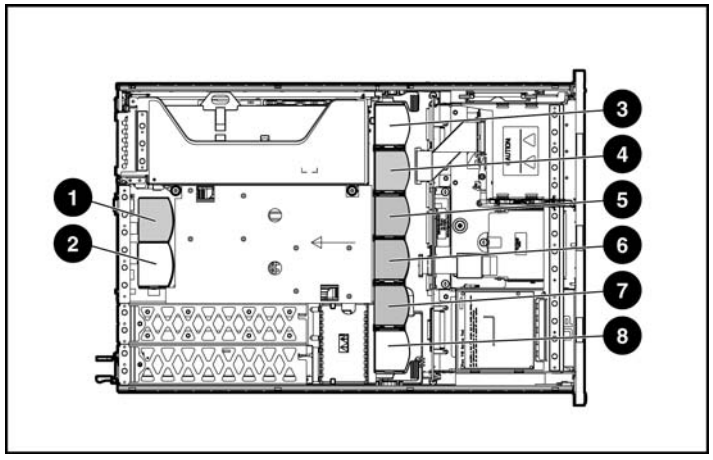
Status
On = AC power connected
Off = AC power disconnected

Remote management connector

The 30-pin remote management connector, located on the system board, is used to cable the RILOE II option. For more information, refer to "SAS RILOE II Cabling ("RILOE cabling (SAS)" on page 89)," "SCSI RILOE II Cabling ("RILOE cabling (SCSI)" on page 101)," or the *Remote Insight Lights-Out Edition II User Guide* on the Documentation CD.

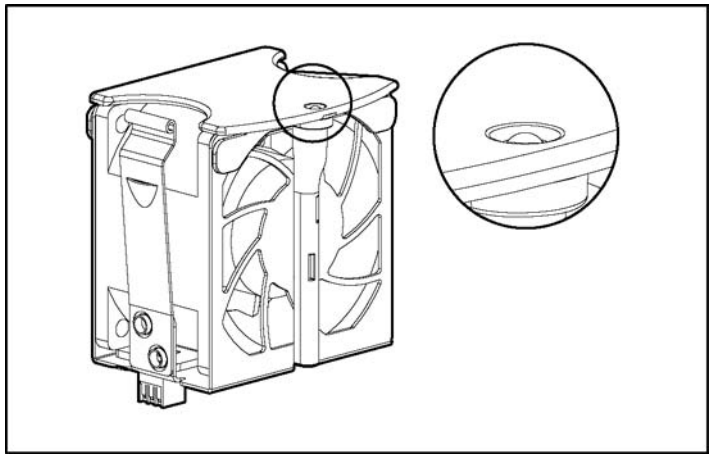


Identifying hot-plug fans



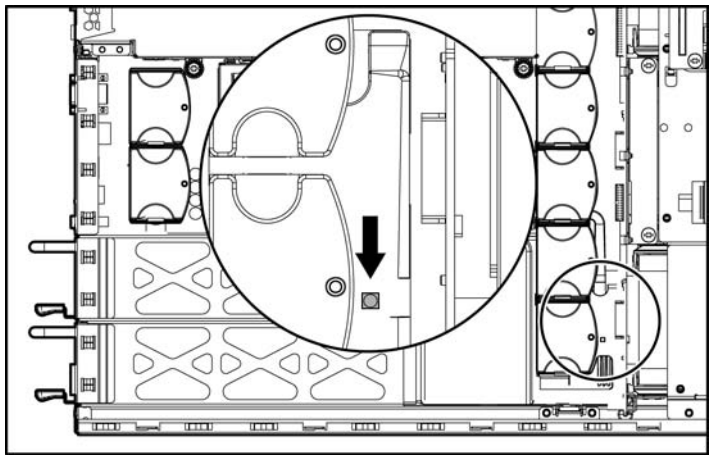
Item	Description	Configuration
1	Fan 1	Primary
2	Fan 2	Redundant
3	Fan 3	Redundant
4	Fan 4	Primary
5	Fan 5	Primary
6	Fan 6	Primary
7	Fan 7	Primary
8	Fan 8	Redundant

Hot-plug fan LED



Status
Green = Operating normally
Amber = Failed
Off = No power

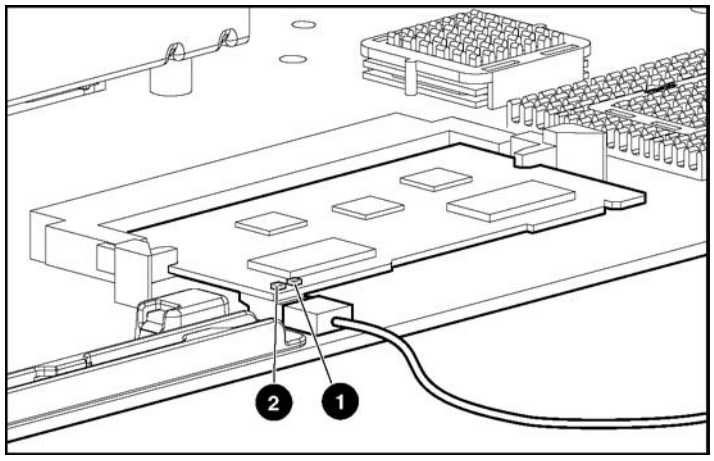
Power converter module LED



Status
Amber = Failed
Off = Operating normally

Battery-backed write cache LEDs

NOTE: This feature applies only to SCSI models.



Item	LED color
1	Amber
2	Green

For LED status information, refer to "Battery-backed write cache LED statuses (on page 32)."

Battery-backed write cache LED statuses

NOTE: This feature applies only to SCSI models.

Server status	LED status	Battery module status
Server is on and has normal run time	Green = On	Fast charging
	Green = Flashing	The microcontroller is waiting for communication from the host controller.
	Green = Off	The battery is fully charged.

Server status	LED status	Battery module status
	Amber = On	A short exists in the connection of one or more of the three button cells within the battery module.
	Amber = Flashing	An open exists in the circuit between the positive and negative terminals of the battery module.
	Amber = Off	Normal
Server is off and is in data retention mode	Amber = Flashing every 15 seconds	User data held in the write cache is being backed up.

Server operations

In this section

Powering up the server 35
Powering down the server 35
Extending the server from the rack 37
Removing the access panel 38
Installing the access panel 39
Accessing the product rear panel 39
Removing the PCI riser cage 40
Installing the PCI riser cage 41
Front fan bracket 43

Powering up the server

To power up the server, press the Power On/Standby button.

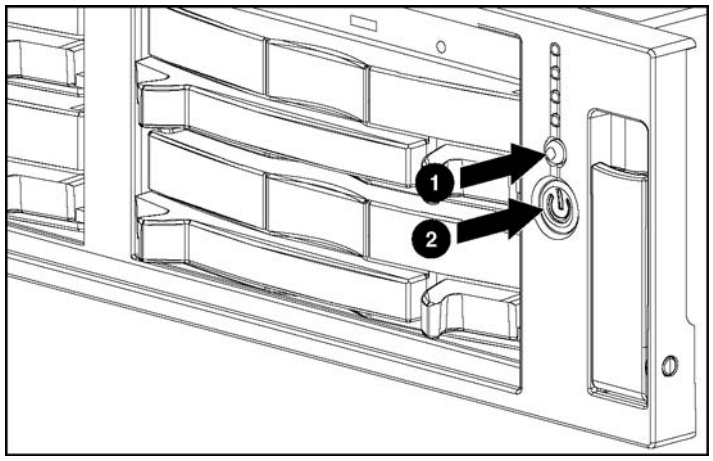
Powering down the server

WARNING: To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. The front panel Power On/Standby button does not completely shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

IMPORTANT: If installing a hot-plug device, it is not necessary to power down the server.

1. Back up the server data.
2. Shut down the operating system as directed by the operating system documentation.
3. If the server is installed in a rack, press the UID LED button on the front panel (1). Blue LEDs illuminate on the front and rear panels of the server.

4. Press the Power On/Standby button to place the server in standby mode (2). When the server activates standby power mode, the system power LED changes to amber.

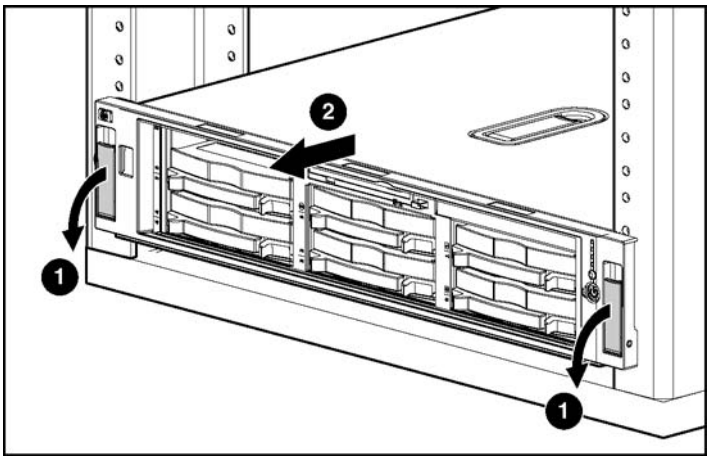


5. If the server is installed in a rack, locate the server by identifying the illuminated rear UID LED button.
6. Disconnect the power cords.

The system is now without power.

Extending the server from the rack

1. Pull down the quick release levers on each side of the server to release the server from the rack.



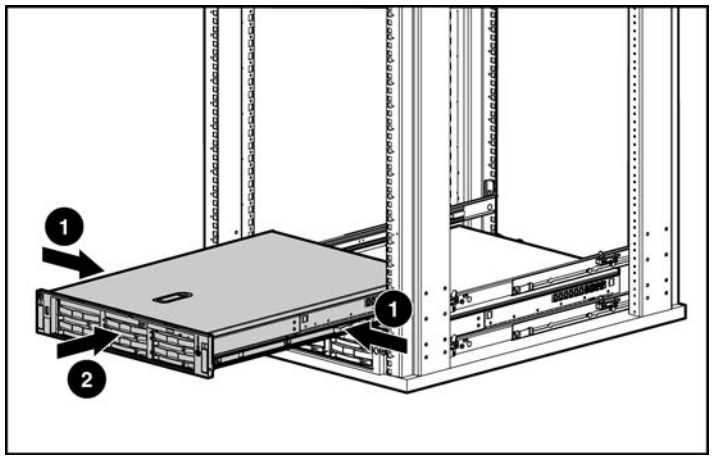
2. Extend the server on the rack rails until the server rail-release latches engage.

WARNING: To reduce the risk of personal injury or equipment damage, be sure that the rack is adequately stabilized before extending a component from the rack.

WARNING: To reduce the risk of personal injury, be careful when pressing the server rail-release latches and sliding the server into the rack. The sliding rails could pinch your fingers.

3. After performing the installation or maintenance procedure, slide the server back into the rack:

a. Press the server rail-release latches and slide the server fully into rack.



b. Press the server firmly into the rack to secure it in place.

Removing the access panel

WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

CAUTION: Do not operate the server for long periods with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.

1. Power down the server if performing a non-hot-plug installation or maintenance procedure ("Powering down the server" on page 35).
2. Extend the server from the rack, if applicable ("Extending the server from the rack" on page 37).
3. Lift up on the hood latch handle and remove the access panel.

Installing the access panel

1. Place the access panel on top of the server with the hood latch open. Allow the panel to extend past the rear of the server approximately 1.25 cm (0.5 in).
2. Push down on the hood latch. The access panel slides to a closed position.

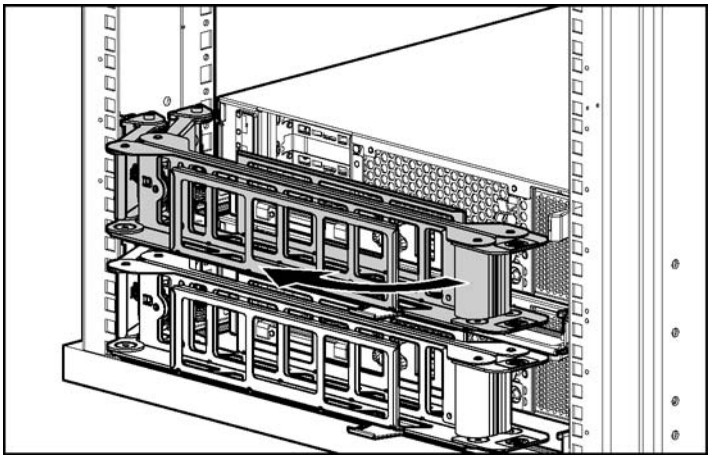
Accessing the product rear panel

Cable management arm with left-hand swing (on page 39)

Cable management arm with right-hand swing (on page 39)

Cable management arm with left-hand swing

To access the server rear panel, open the cable management arm:

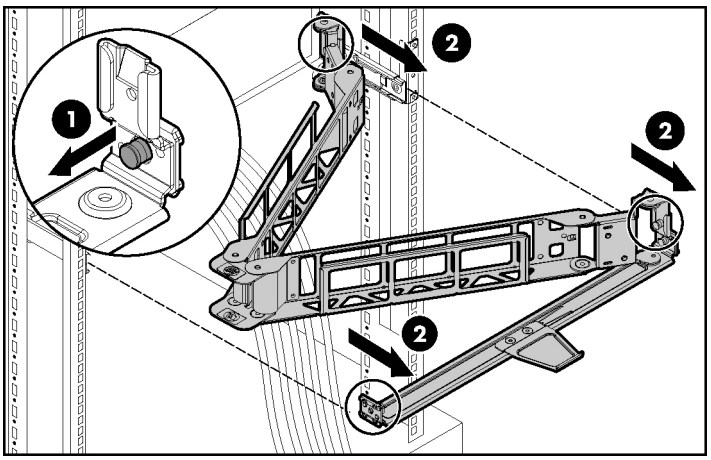


Cable management arm with right-hand swing

NOTE: To access some components, you may need to remove the cable management arm.

To access the product rear panel components, open the cable management arm:

1. Power down the server ("Powering down the server" on page 35).
2. Swing open the cable management arm.
3. Remove the cables from the cable trough.
4. Remove the cable management arm.



Removing the PCI riser cage

CAUTION: To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.

1. Power down the server ("Powering down the server" on page 35).
2. Extend the server from the rack, if applicable ("Extending the server from the rack" on page 37).
3. Remove the access panel.

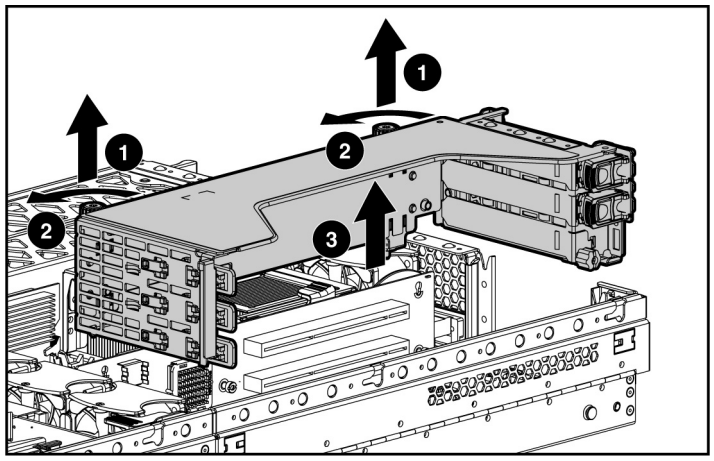
CAUTION: Always wear an antistatic wrist strap when working inside the server.

4. Disconnect any internal or external cables connected to any existing expansion boards.
5. Remove the PCI riser cage:

a. Lift the PCI riser cage thumbscrews (1).

b. Turn the thumbscrews counter-clockwise to loosen them (2).

c. Lift the PCI riser cage from the server (3).

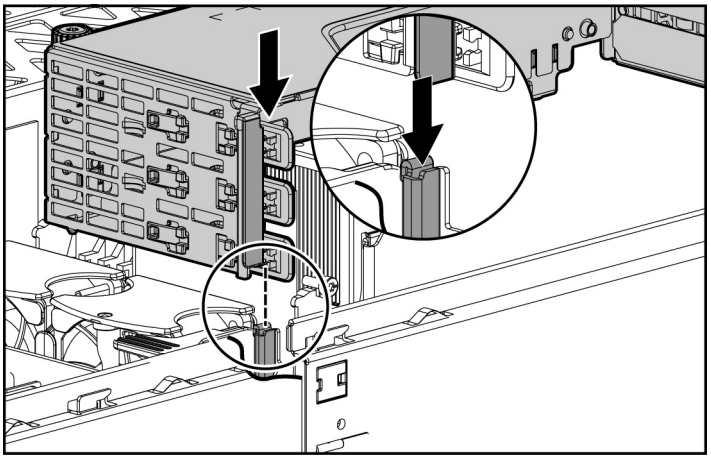


CAUTION: If a RILOE board is installed in the riser cage, the cable to the system board must be removed after the riser cage is partially lifted from the server.

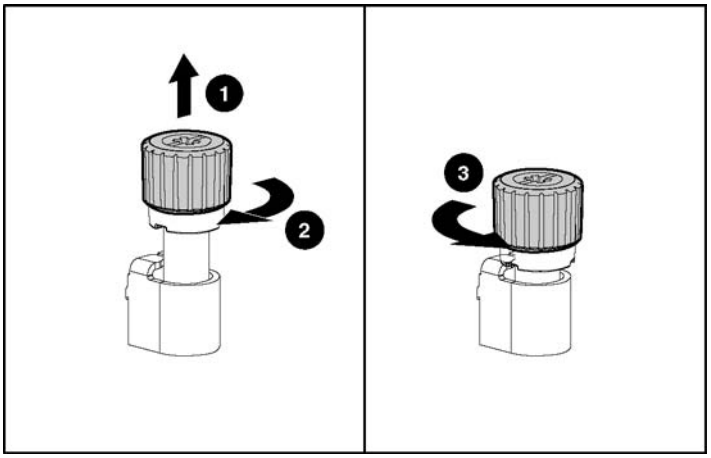
Installing the PCI riser cage

CAUTION: To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.

1. Align the PCI riser cage with the chassis and slide it into place.



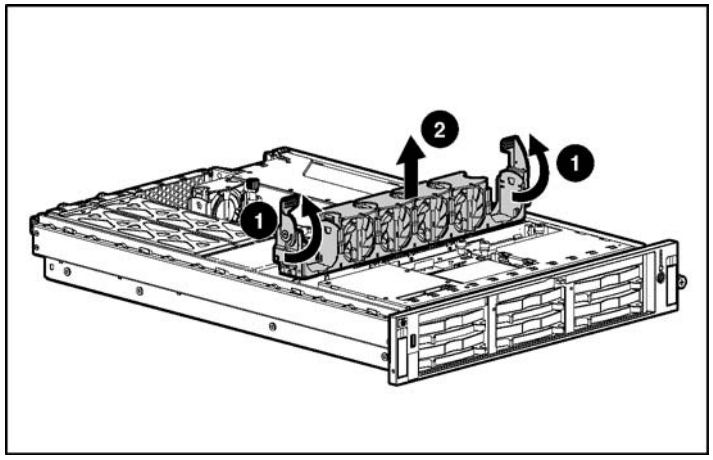
2. Tighten the thumbscrews to secure the PCI riser cage:
   a. Lift the thumbscrew knobs.
   b. Turn the thumbscrews clockwise while pressing down, until tightened.
   c. Turn the thumbscrews counterclockwise to lower the thumbscrew knobs.



Front fan bracket

To remove the component:

1. Power down the server ("Powering down the server" on page 35).
2. Extend or remove the server from the rack ("Extending the server from the rack" on page 37).
3. Remove the access panel.
4. Remove the front fan bracket.



5. Remove all hot-plug fans from the front fan bracket.

To replace the front fan bracket, reverse the removal steps and press down on the top of each fan to be sure it is seated properly.

Server setup

In this section

Optional installation services....45
Rack planning resources....46
Optimum environment....46
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Registering the server....56

Optional installation services

Delivered by experienced, certified engineers, HP Care Pack services help you keep your servers up and running with support packages tailored specifically for HP ProLiant systems. HP Care Packs let you integrate both hardware and software support into a single package. A number of service level options are available to meet your needs.

HP Care Pack Services offer upgraded service levels to expand your standard product warranty with easy-to-buy, easy-to-use support packages that help you make the most of your server investments. Some of the Care Pack services are:

- Hardware support
  - 6-Hour Call-to-Repair
  - 4-Hour 24x7 Same Day
  - 4-Hour Same Business Day
- Software support
  - Microsoft®
  - Linux

  - HP ProLiant Essentials (HP SIM and RDP)
  - VMWare
- Integrated hardware and software support
  - Critical Service
  - Proactive 24
  - Support Plus
  - Support Plus 24
- Startup and implementation services for both hardware and software

For more information on Care Packs, refer to the HP website (http://www.hp.com/hps/carepack/servers/cp_proliant.html).

Rack planning resources

The rack resource kit ships with all HP branded or Compaq branded 9000, 10000, and H9 series racks. For more information on the content of each resource, refer to the rack resource kit documentation.

If you intend to deploy and configure multiple servers in a single rack, refer to the white paper on high-density deployment at the HP website (http://www.hp.com/products/servers/platforms).

Optimum environment

When installing the server in a rack, select a location that meets the environmental standards described in this section.

Space and airflow requirements

To allow for servicing and adequate airflow, observe the following space and airflow requirements when deciding where to install a rack:

- Leave a minimum clearance of 63.5 cm (25 in) in front of the rack.

- Leave a minimum clearance of 76.2 cm (30 in) behind the rack.
- Leave a minimum clearance of 121.9 cm (48 in) from the back of the rack to the back of another rack or row of racks.

HP servers draw in cool air through the front door and expel warm air through the rear door. Therefore, the front and rear rack doors must be adequately ventilated to allow ambient room air to enter the cabinet, and the rear door must be adequately ventilated to allow the warm air to escape from the cabinet.

CAUTION: To prevent improper cooling and damage to the equipment, do not block the ventilation openings.

When vertical space in the rack is not filled by a server or rack component, the gaps between the components cause changes in airflow through the rack and across the servers. Cover all gaps with blanking panels to maintain proper airflow.

CAUTION: Always use blanking panels to fill empty vertical spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.

The HP 9000 and 10000 Series Racks provide proper server cooling from flow-through perforations in the front and rear doors that provide 64 percent open area for ventilation.

CAUTION: When using a Compaq branded 7000 Series rack, you must install the high airflow rack door insert [P/N 327281-B21 (42U) or P/N 157847-B21 (22U)] to provide proper front-to-back airflow and cooling.

IMPORTANT: The ProLiant DL380 G4 server cable management arm is not supported on Compaq branded 7000 series racks.

CAUTION: If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

- Front and rear doors—If the 42U rack includes closing front and rear doors, you must allow 5,350 sq cm (830 sq in) of holes evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
- Side—The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 in).

Temperature requirements

To ensure continued safe and reliable equipment operation, install or position the system in a well-ventilated, climate-controlled environment.

The maximum recommended ambient operating temperature (TMRA) for most server products is 35°C (95°F). The temperature in the room where the rack is located must not exceed 35°C (95°F).

CAUTION: To reduce the risk of damage to the equipment when installing third-party options:

- Do not permit optional equipment to impede airflow around the server or to increase the internal rack temperature beyond the maximum allowable limits.
- Do not exceed the manufacturer's TMRA.

Power requirements

Installation of this equipment must comply with local and regional electrical regulations governing the installation of information technology equipment by licensed electricians. This equipment is designed to operate in installations covered by NFPA 70, 1999 Edition (National Electric Code) and NFPA-75, 1992 (code for Protection of Electronic Computer/Data Processing Equipment). For electrical power ratings on options, refer to the product rating label or the user documentation supplied with that option.

WARNING: To reduce the risk of personal injury, fire, or damage to the equipment, do not overload the AC supply branch circuit that provides power to the rack. Consult the electrical authority having jurisdiction over wiring and installation requirements of your facility.

CAUTION: Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

When installing more than one server, you may need to use additional power distribution devices to safely provide power to all devices. Observe the following guidelines:

- Balance the server power load between available AC supply branch circuits.
- Do not allow the overall system AC current load to exceed 80 percent of the branch circuit AC current rating.
- Do not use common power outlet strips for this equipment.
- Provide a separate electrical circuit for the server.

Electrical grounding requirements

The server must be grounded properly for proper operation and safety. In the United States, you must install the equipment in accordance with NFPA 70, 1999 Edition (National Electric Code), Article 250, as well as any local and regional building codes. In Canada, you must install the equipment in accordance with Canadian Standards Association, CSA C22.1, Canadian Electrical Code. In all other countries, you must install the equipment in accordance with any regional or national electrical wiring codes, such as the International Electrotechnical Commission (IEC) Code 364, parts 1 through 7. Furthermore, you must be sure that all power distribution devices used in the installation, such as branch wiring and receptacles, are listed or certified grounding-type devices.

Because of the high ground-leakage currents associated with multiple servers connected to the same power source, HP recommends the use of a PDU that is either permanently wired to the building's branch circuit or includes a nondetachable cord that is wired to an industrial-style plug. NEMA locking-style plugs or those complying with IEC 60309 are considered suitable for this purpose. Using common power outlet strips for the server is not recommended.

Rack warnings

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- **The leveling jacks are extended to the floor.**
- **The full weight of the rack rests on the leveling jacks.**
- **The stabilizing feet are attached to the rack if it is a single-rack installation.**
- **The racks are coupled together in multiple-rack installations.**
- **Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.**

WARNING: To reduce the risk of personal injury or equipment damage when unloading a rack:

- **At least two people are needed to safely unload the rack from the pallet. An empty 42U rack can weigh as much as 115 kg (253 lb), can stand more than 2.1 m (7 ft) tall, and may become unstable when being moved on its casters.**
- **Never stand in front of the rack when it is rolling down the ramp from the pallet. Always handle the rack from both sides.**

WARNING: Components can be very heavy. To reduce the risk of personal injury or damage to the equipment:

- **Remove all pluggable power supplies and modules to reduce the weight of the product before lifting it.**
- **Observe local occupational health and safety requirements and guidelines for manual material handling.**
- **Get help to lift and stabilize the product during installation or removal, especially when the product is not fastened to the rails. When the component weighs more than 22.5 kg (50 lb), at least two people must lift the component into the rack together. If the component is loaded into the rack above chest level, a third person must assist in aligning the rails while the other two support the component.**
- **Use caution when installing the component in or removing the component from the rack; it is unstable when not fastened to the rails.**

Identifying the contents of the server shipping carton

Unpack the server shipping carton and locate the materials and documentation necessary for installing the server. All the rack mounting hardware necessary for installing the server into the rack is included with the rack or the server.

The contents of the server shipping carton include:

- Server
- Power cord
- Hardware documentation, Documentation CD, and software products
- Rack mounting hardware

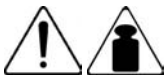
In addition to the supplied items, you may need:

- Operating system or application software
- Hardware options

Installing hardware options

Install any hardware options before initializing the server. For options installation information, refer to the option documentation. For server-specific information, refer to "Hardware options installation (on page 57)."

Installing the server into the rack



20.41 - 27.22 kg

47.18 - 60.0 lb

WARNING: To reduce the risk of personal injury or damage to the equipment:

- **Observe local occupation health and safety requirements and guidelines for manual handling.**
- **Obtain adequate assistance to lift and stabilize the chassis during installation or removal.**
- **The server is unstable when not fastened to the rails.**
- **When mounting the server in a rack, remove the power supplies and any other removable module to reduce the overall weight of the product.**

CAUTION: Always plan the rack installation so that the heaviest item is on the bottom of the rack. Install the heaviest item first, and continue to populate the rack from the bottom to the top.

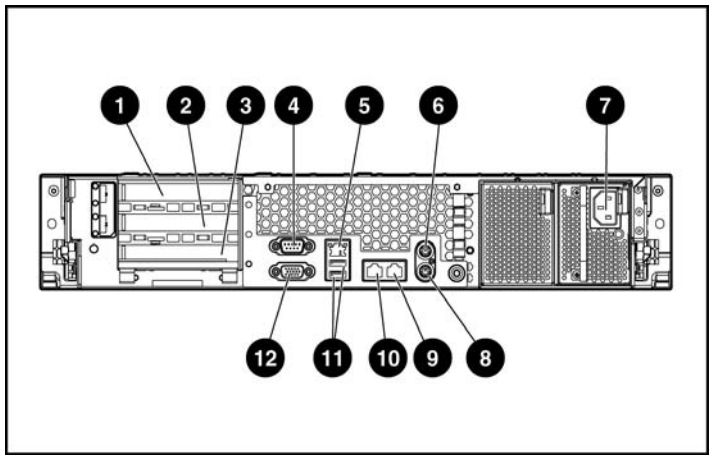
1. Install the server into the rack. Refer to the installation instructions that ship with the 2U Quick Deploy Rail System for more information.
2. Install the cable management arm into the rack.

   NOTE: If the cable management arm is mounted on the right side of the rack, you will have to remove it when adding or replacing a redundant hot-plug power supply.

3. Connect peripheral devices to the server.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into RJ-45 connectors.

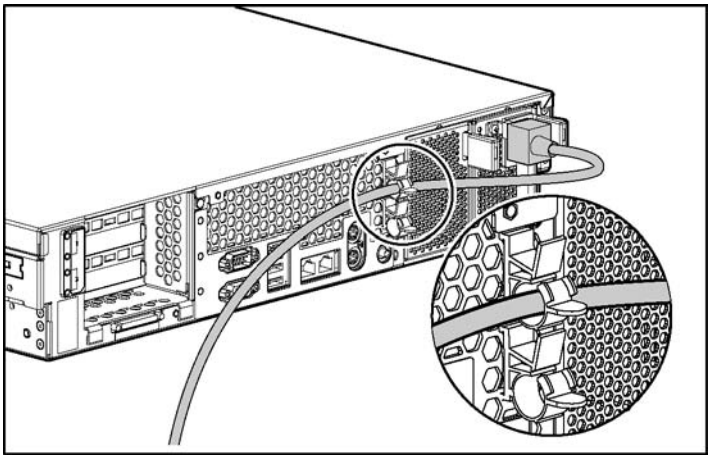
IMPORTANT: If the RILOE II board is installed in the server, be sure that you attach the video cable to the video connector on the rear of the RILOE II board. The standard video connector on the server rear panel is not used when the RILOE II board is installed. For more information, refer to the *HP Remote Insight Lights-Out Edition II User Guide*.



Item	Description	Connector Color
1	PCI-X expansion slot 1, 64 bit/100 MHz, Bus A	N/A
2	PCI-X expansion slot 2, 64 bit/100 MHz, Bus A	N/A
3	PCI-X expansion slot 3, 64 bit/133 MHz, Bus B	N/A
4	Serial connector	Teal
5	iLO connector	N/A
6	Mouse connector	Green
7	Power cord connector	N/A
8	Keyboard connector	Purple
9	NIC 1 connector	N/A
10	NIC 2 connector	N/A

Item	Description	Connector Color
11	USB connectors (2)	Black
12	Video connector	Blue

4. Connect the power cord to the back of the server.
5. If you chose not to install the cable management arm, install the power cord anchor to the server.

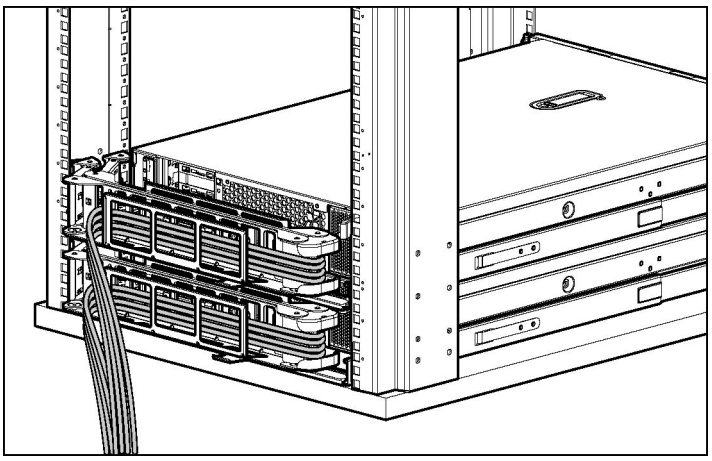


NOTE: Peripheral device cables are removed for clarity.

NOTE: If using the power cord anchor, be sure to leave enough slack in the power cord so that the redundant power supply can be removed without disconnecting the power cord from the primary power supply.

6. Secure cables to the cable management arm.

IMPORTANT: When using cable management arm components, be sure to leave enough slack in each of the cables to prevent damage to the cables when the server is extended from the rack.



7. Connect the power cord to the AC power source.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**
- **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**
- **Unplug the power cord from the power supply to disconnect power to the equipment.**
- **Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.**

Powering up and configuring the server

To power up the server, press the Power On/Standby button.

While the server boots, RBSU and the ORCA utility are automatically configured to prepare the server for operating system installation.

To configure these utilities manually:

- Press the **F8** key when prompted during the array controller initialization to configure the array controller using ORCA.
- Press the **F9** key when prompted during the boot process to change the server settings using RBSU. The system is set up by default for the English language.

For more information on the automatic configuration, refer to the *HP ROM-Based Setup Utility User Guide* located on the Documentation CD.

Installing the operating system

To operate properly, the server must have a supported operating system. For the latest information on supported operating systems, refer to the HP website (http://www.hp.com/go/supportos).

Two methods are available to install an operating system on the server:

- SmartStart assisted installation—Insert the SmartStart CD into the CD-ROM drive and reboot the server.
- Manual installation—Insert the operating system CD into the CD-ROM drive and reboot the server. This process may require you to obtain additional drivers from the HP website (http://www.hp.com/support).

Follow the on-screen instructions to begin the installation process.

For information on using these installation paths, refer to the SmartStart installation poster in the HP ProLiant Essentials Foundation Pack, included with the server.

Registering the server

To register a server, refer to the registration card in the HP ProLiant Essentials Foundation Pack or the HP Registration website (http://register.hp.com).

Hardware options installation

In this section

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Processor option 58
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Introduction

If more than one option is being installed, read the installation instructions for all the hardware options and identify similar steps to streamline the installation process.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

CAUTION: To prevent damage to electrical components, properly ground the server before beginning any installation procedure. Improper grounding can cause electrostatic discharge.

Processor option

The server supports single- and dual-processor operation. With two processors installed, the server supports boot functions through the processor installed in processor socket 1.

The server PPMs are DC-to-DC converters that provide the proper power to each processor. Each PPM must be installed in the slot adjacent to its processor.

CAUTION: Always wear an antistatic wrist strap when working inside the server.

CAUTION: To prevent possible server malfunction, do not mix processors of different types.

IMPORTANT: If upgrading processor speed, update the system ROM before installing the processor.

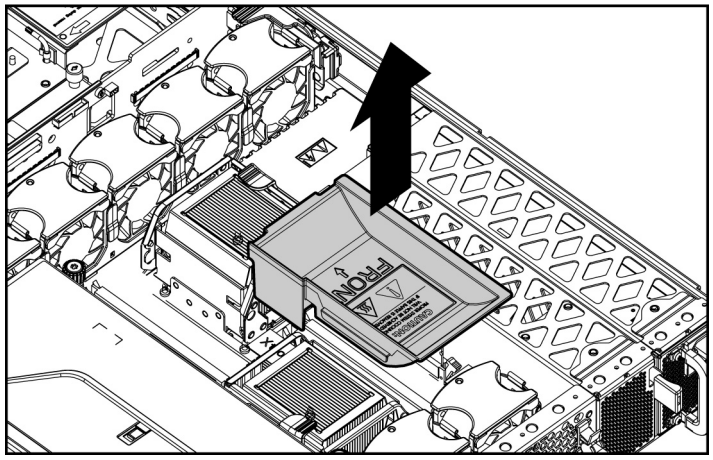
IMPORTANT: Processor socket 1 and PPM slot 1 must be populated at all times or the server will not function properly.

IMPORTANT: Always install a PPM when you install a processor. The system fails to boot if the PPM is missing.

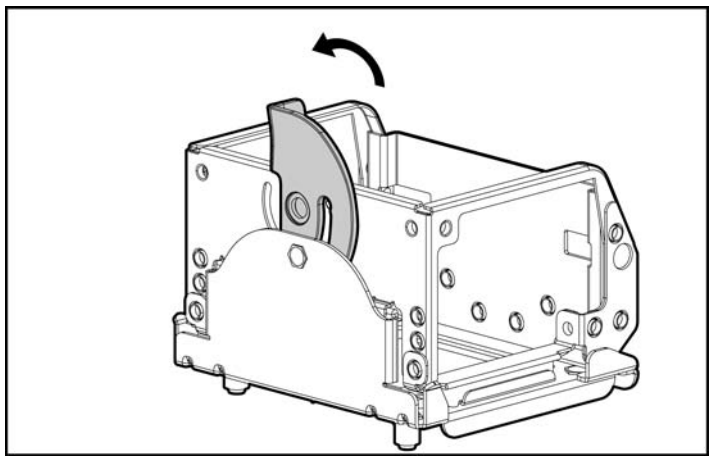
To install a processor:

1. Power down the server ("Powering down the server" on page 35).
2. Extend the server from the rack, if applicable ("Extending the server from the rack" on page 37).
3. Remove the access panel.

4. Remove the air baffle.



5. Unlock the processor retaining bracket.
6. Open the processor retaining bracket.



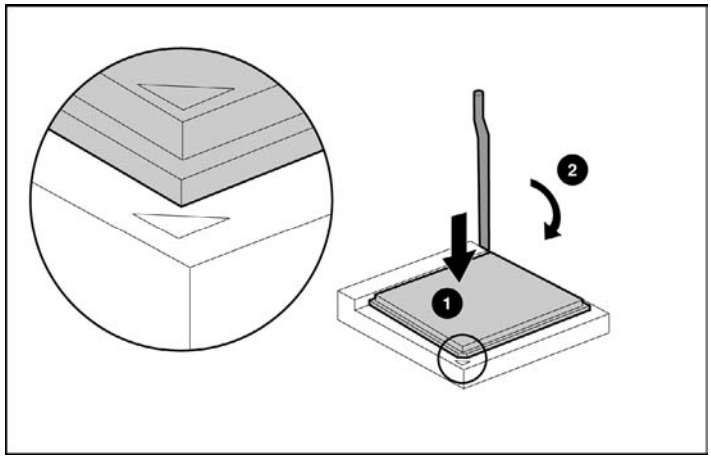
7. Release the processor locking lever.

CAUTION: Failure to completely open the processor locking lever prevents the processor from seating during installation, leading to hardware damage.

CAUTION: To prevent possible server malfunction or damage to the equipment, be sure to align the processor pins with the corresponding holes in the socket.

8. Install the processor.

IMPORTANT: The key on the processor must be aligned with the keyed corner of the processor socket.

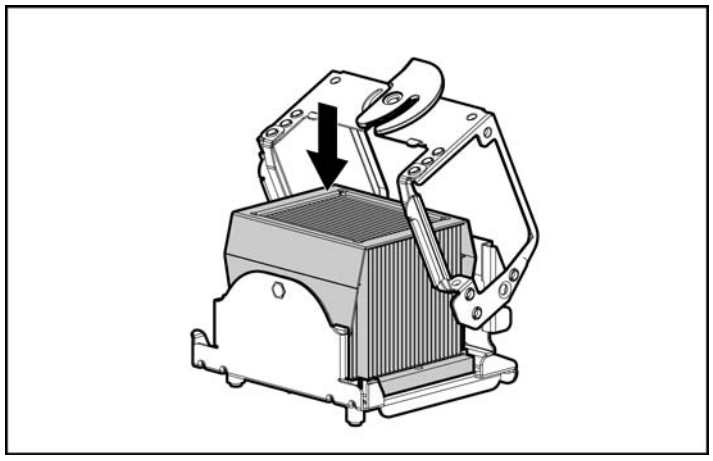


9. Close the processor locking lever.

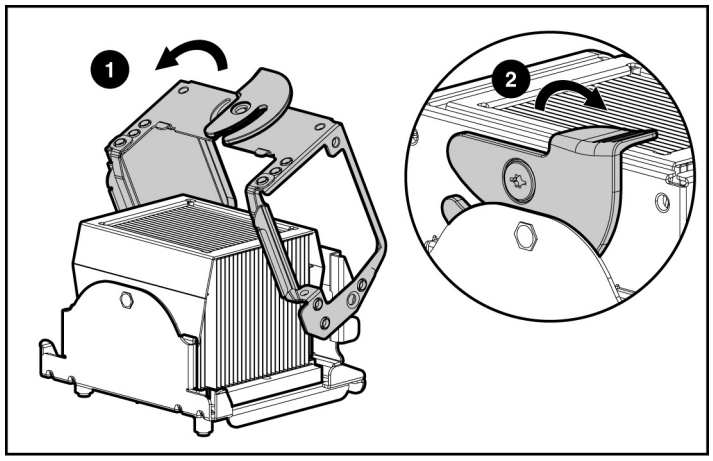
CAUTION: To prevent possible server malfunction or damage to the equipment, be sure to completely close the processor locking lever.

10. Remove the heatsink protective cover from the heatsink.

11. Install the heatsink.

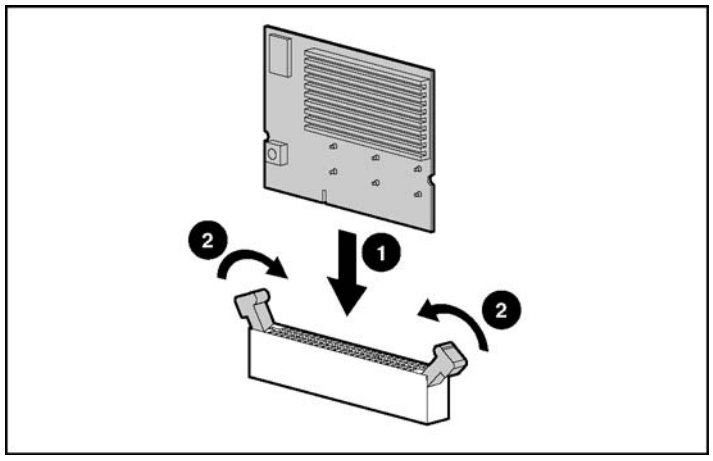


12. Close the processor retaining bracket.



13. Open the latches on the corresponding PPM slot.

14. Install the PPM.



NOTE: The appearance of compatible PPMs may vary.

15. Install the air baffle.
16. Install the access panel ("Installing the access panel" on page 39).
17. Power up the server ("Powering up the server" on page 35).

Memory options

You can expand server memory by installing PC-3200 Registered DDR SDRAM DIMMs. The server supports up to 16 GB of memory using eight 2-GB DIMMs.

NOTE: The server is set to **Advanced ECC Support**. For more information, refer to "HP ROM-Based Setup Utility (on page 105)" or the *HP Rom-Based Setup Utility User Guide* located on the Documentation CD.

NOTE: PC2 memory, also known as DDR2 SDRAM, is not supported.

Refer to "DIMM Slots (on page 17)" for DIMM slot locations and bank assignments.

DIMM installation guidelines

You must observe the following guidelines when installing additional memory:

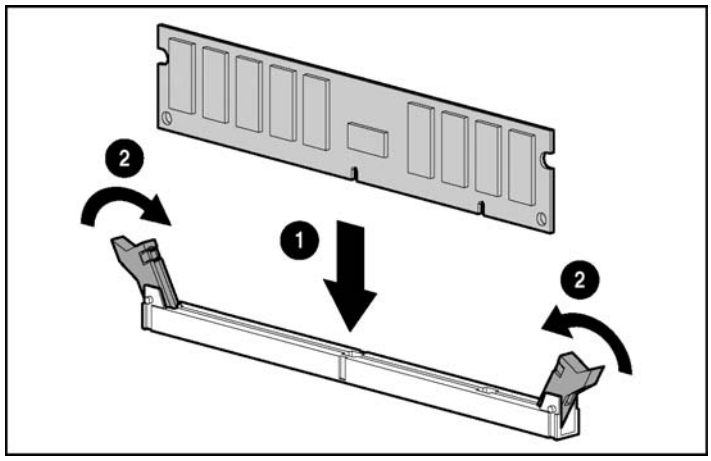
- Always install memory in pairs of two identical DIMMs.
- Install only ECC PC-3200 Registered SDRAM DIMMs that meet the following specifications:
  - Supply voltage - 2.6 volts
  - Bus width - 72 bits
- Install DIMMs with the same speed.
- Install DIMMs into both slots within a single bank.
- Memory must be installed in pairs (banks) beginning with banks furthest away from each populated processor (banks B and D).
- Processor 2 may be installed without memory.
- Any memory installed into banks for processor 2 can be used only if processor 2 is installed.

CAUTION: Always wear an antistatic wrist strap when working inside the server.

Installing DIMMs

1. Power down the server ("Powering down the server" on page 35).
2. Extend the server from the rack, if applicable ("Extending the server from the rack" on page 37).
3. Remove the access panel.
4. Open the DIMM slot latches.

5. Install the DIMM.



6. Install the access panel ("Installing the access panel" on page 39).

Hot-plug SCSI hard drive options

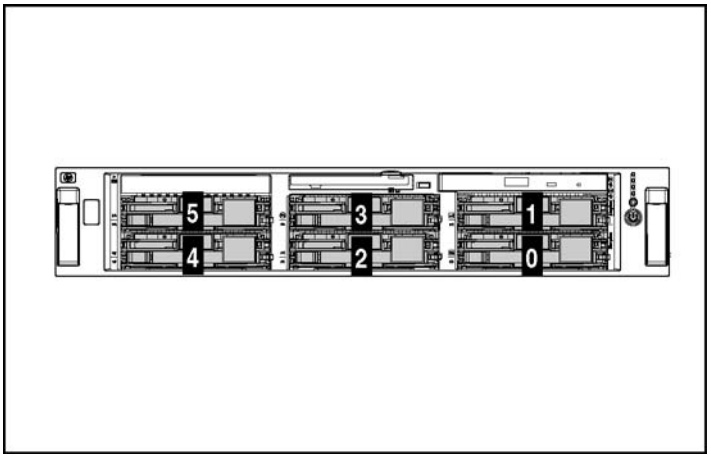
When adding SCSI hard drives to the server, observe the following general guidelines:

- A maximum of 14 SCSI devices per channel can be added.
- Each SCSI drive must have a unique ID. The system automatically sets all SCSI IDs.
- The SCSI ID for each hot-plug hard drive is set automatically to the next sequential ID number in a series beginning with ID0.
- If only one SCSI hard drive is used, install it in the bay with the lowest number.
- Hot-plug hard drives must be either Wide Ultra2, Ultra3, or Ultra320 SCSI types. Mixing these types with other drive standards degrades the overall performance of the drive subsystem.
- Drives must be the same capacity to provide the greatest storage space efficiency when drives are grouped together into the same drive array.

SCSI IDs

The server supports single- or dual-channel hard drive configurations. The single-channel configuration (simplex) supports up to six hard drives on one channel. The dual-channel configuration (duplex) supports two hard drives on one channel (SCSI IDs 0 and 1) and up to four hard drives on the other channel (SCSI IDs 2 through 5).

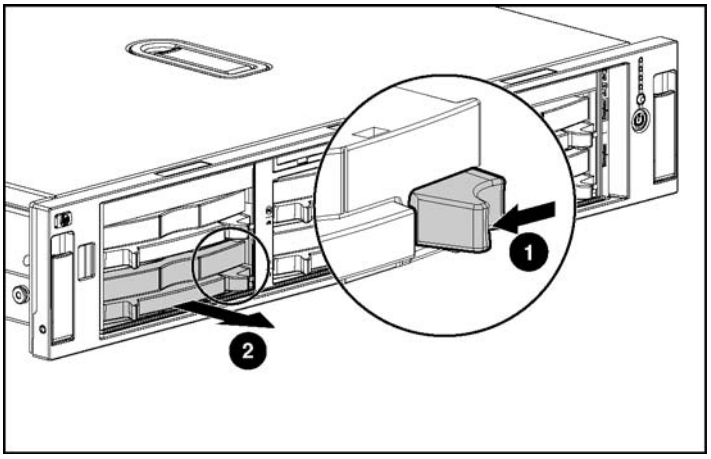
The SCSI IDs for both simplex and duplex configurations are illustrated. Always populate hard drive bays starting with the lowest SCSI ID.



Removing a SCSI hard drive blank

CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

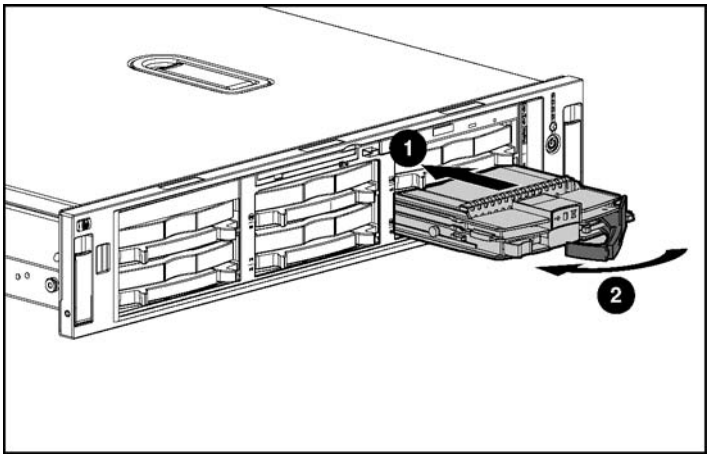
NOTE: The server ships standard with five hard drive blanks.



Installing a hot-plug SCSI hard drive

CAUTION: Always power down the server if the boot partition resides on the drive you are replacing or if you are replacing the only drive in the server.

1. Remove the existing hard drive blank or hard drive from the drive bay.
2. Install the hard drive.



3. Determine the status of the hard drive from the hot-plug hard drive LEDs ("Hot-plug SCSI hard drive LED combinations" on page 25, "Hot-plug SCSI hard drive LEDs" on page 24).

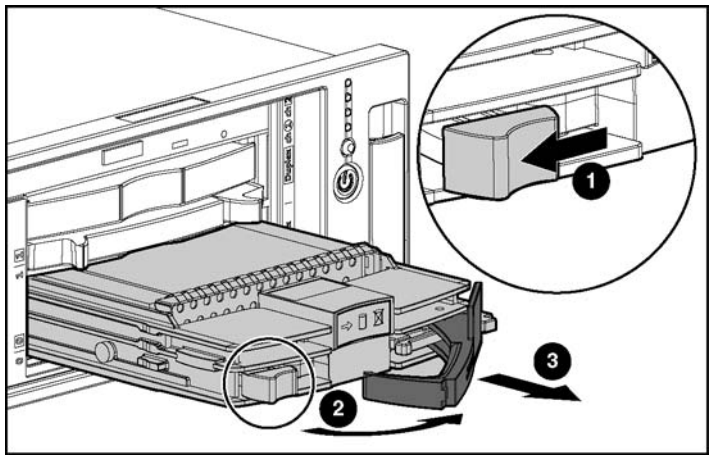
Resume normal server operations.

Removing a hot-plug SCSI hard drive

CAUTION: Always power down the server if the boot partition resides on the drive you are replacing or if you are replacing the only drive in the server.

CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

1. Determine the status of the hard drive from the hot-plug hard drive LEDs ("Hot-plug SCSI hard drive LED combinations" on page 25, "Hot-plug SCSI hard drive LEDs" on page 24).
2. Back up all server data on the hard drive.
3. Remove the hard drive.



Power supply blank

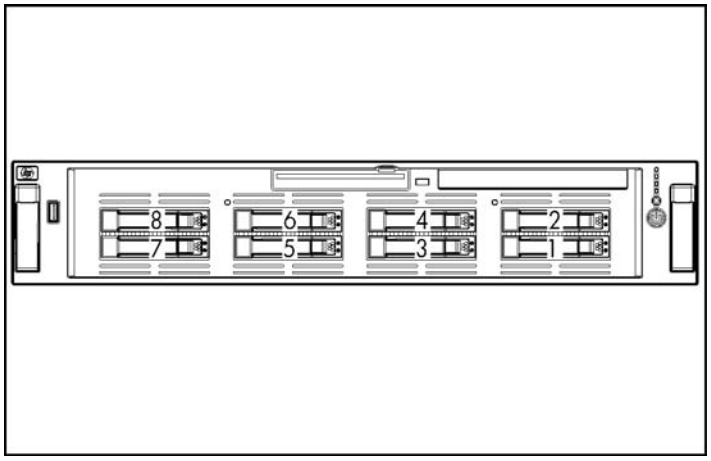
Loosen the thumbscrew that secures the redundant power supply blank, and then pull the blank from the back of the server.

Hot-plug SAS hard drive options

When adding hard drives to the server, observe the following general guidelines:

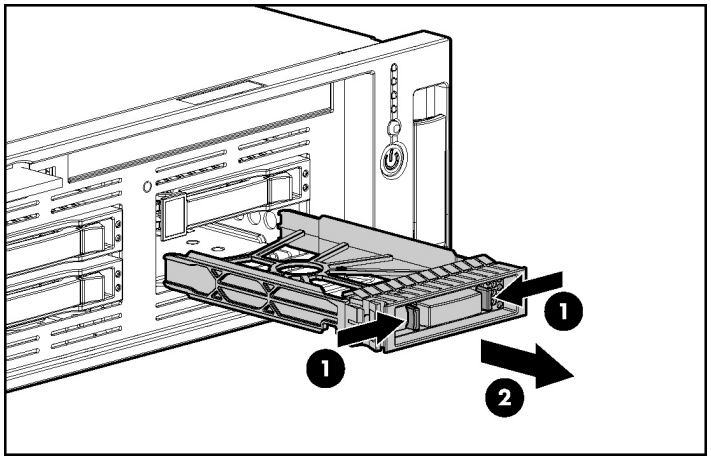
- The system automatically sets all drive numbers.
- If only one hard drive is used, install it in the bay with the lowest drive number.
- Hard drives must be SFF types.
- Drives should be the same capacity to provide the greatest storage space efficiency when drives are grouped together into the same drive array.

SAS drive numbers

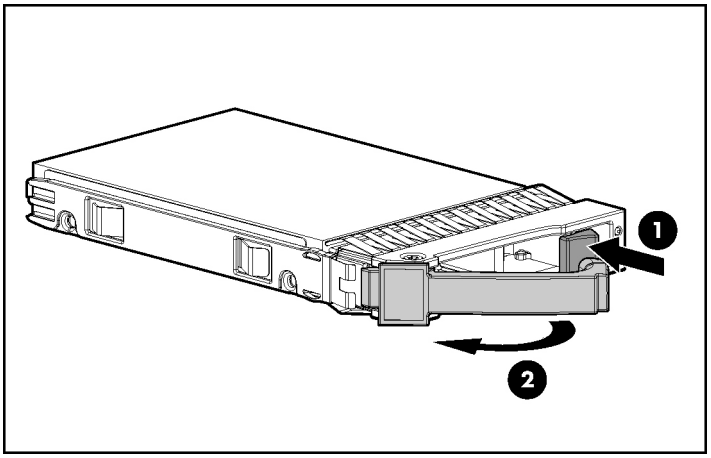


Installing a hot-plug SAS hard drive

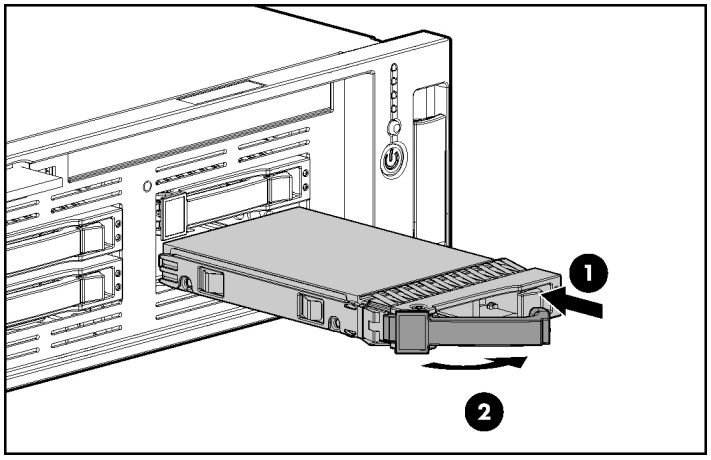
1. Remove the SAS hard drive blank.



2. Prepare the SAS hard drive.



3. Install the hard drive.



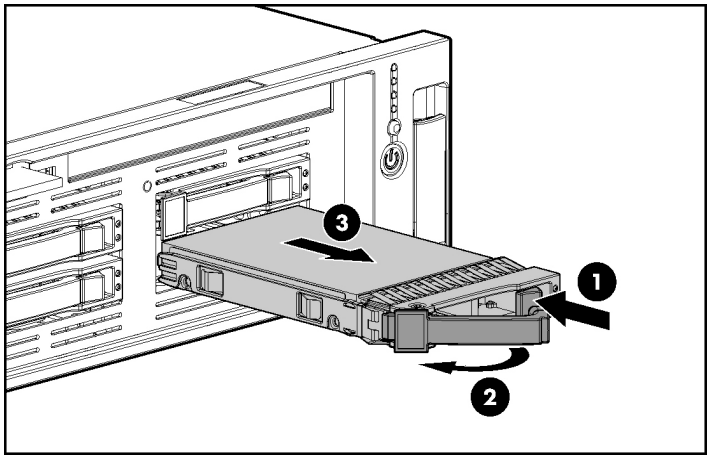
4. Determine the status of the hard drive from the hot-plug SAS hard drive LED combinations (on page 26).

Removing a hot-plug SAS hard drive

CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

1. Determine the status of the hard drive from the hot-plug SAS hard drive LED combinations (on page 26).
2. Back up all server data on the hard drive.

3. Remove the hard drive.

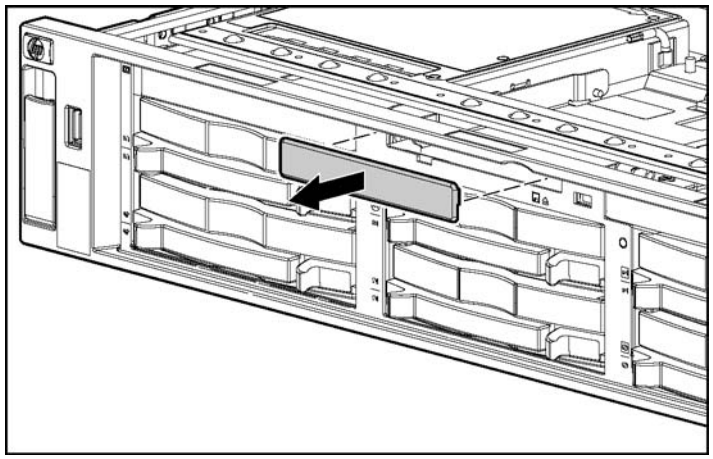


Installing a diskette drive

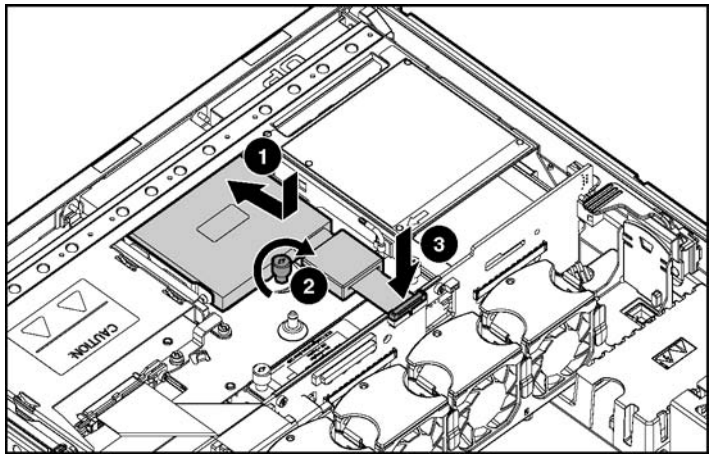
NOTE: This procedure shows images of the SCSI model server, but it also applies to the SAS model server.

1. Power down the server ("Powering down the server" on page 35).
2. Extend the server from the rack, if applicable ("Extending the server from the rack" on page 37).
3. Remove the access panel.

4. Remove the protective cover on the server bezel from the front of the diskette drive bay.



5. Slide the diskette drive into the diskette drive bay.
6. Tighten the thumbscrew.
7. Secure the diskette drive cable to the diskette drive cable connector on the SCSI backplane board or SAS backplane board.

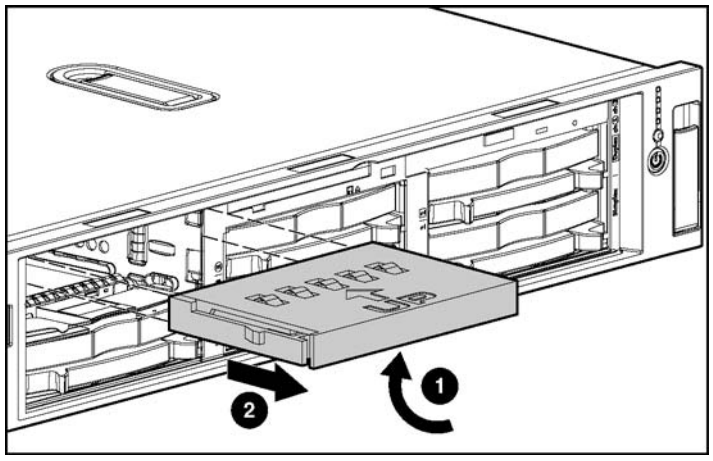


8. Install the access panel ("Installing the access panel" on page 39).
9. Power up the server ("Powering up the server" on page 35).

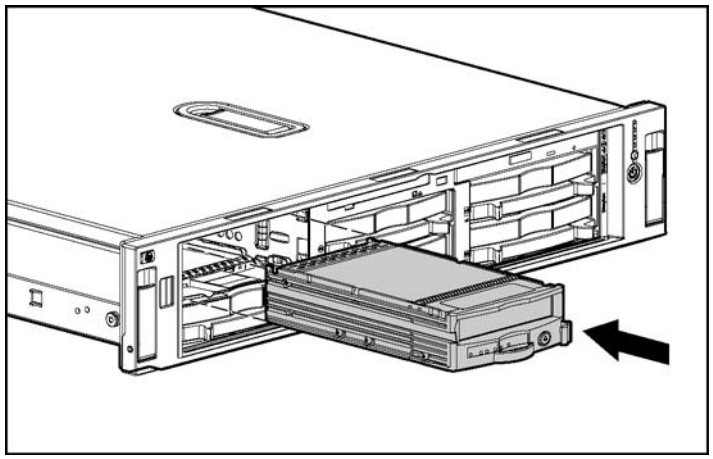
Hot-plug tape drive option

NOTE: This feature applies only to SCSI models.

1. Remove the existing hard drive blank or hard drive from the upper-left drive bay.
2. Reach underneath and squeeze the middle of the tape drive blank (1).
3. Pull the blank out of the bay (2).



4. Install the tape drive.



Redundant hot-plug fans

NOTE: This procedure shows images of the SCSI model server, but it also applies to the SAS model server.

In the standard configuration, five fans cool the server. For the redundant configuration, three additional fans are added to allow the server to continue operation in non-redundant mode if any one fan fails.

The server supports variable fan speeds to allow the speed of all fans to increase if the temperature in any area increases. The fans will run at minimum speed until a temperature change requires a fan speed increase to cool the server.

The server shuts down in the following scenarios:

- At POST:
  - The BIOS suspends the server for 5 minutes if it detects a cautionary temperature level. If the cautionary temperature level is still detected after 5 minutes, the BIOS performs an orderly shutdown and then restarts. This process repeats until the cautionary temperature level is no longer detected.
  - The BIOS performs an orderly shutdown if less than five fans are operating in the standard configuration or if less than seven fans are operating in the redundant configuration.
  - The server performs an immediate shutdown if it detects a critical temperature level.

    IMPORTANT: An immediate shutdown is a hardware-controlled function and it overrides any firmware or software actions.
- In the OS:
  - With the health driver loaded and thermal shutdown enabled in RBSU, the health driver performs an orderly shutdown if it detects a cautionary temperature level. If the server detects a critical temperature level before the orderly shutdown occurs, the server performs an immediate shutdown.

    Additionally, the health driver performs an orderly shutdown if less than five fans are operating in the standard configuration, or if less than seven fans are operating in the redundant configuration.

– With the health driver loaded and thermal shutdown disabled in RBSU, the server performs an immediate shutdown if it detects a critical temperature level.

– Without the health driver loaded, the server performs an immediate shutdown if it detects a critical temperature level.

IMPORTANT: An immediate shutdown is a hardware-controlled function and it overrides any firmware or software actions.

Hot-plug fan installation requirements

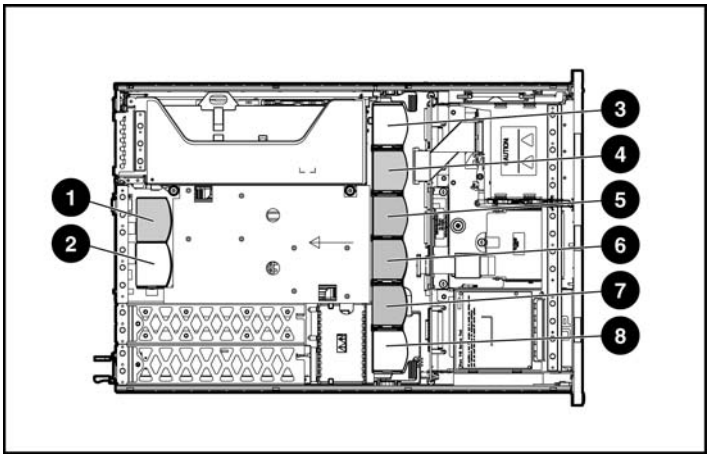
WARNING: To reduce the risk of electric shock, personal injury, and damage to the equipment:

- **Do not attempt to service any parts of the equipment other than those specified in the following procedure. Any other activities may require that you shut down the server and remove the power cord.**
- **Installation and maintenance of this product must be performed by individuals who are knowledgeable about the procedures, precautions and hazards associated with the product.**

You must observe the following requirements when installing redundant hot-plug fans:

- To ensure optimum cooling, populate the primary fan locations before populating the redundant locations.
- If a primary fan fails, replace the nonfunctioning fan before installing fans in redundant locations.

Identifying hot-plug fans



Item	Description	Configuration
1	Fan 1	Primary
2	Fan 2	Redundant
3	Fan 3	Redundant
4	Fan 4	Primary
5	Fan 5	Primary
6	Fan 6	Primary
7	Fan 7	Primary
8	Fan 8	Redundant

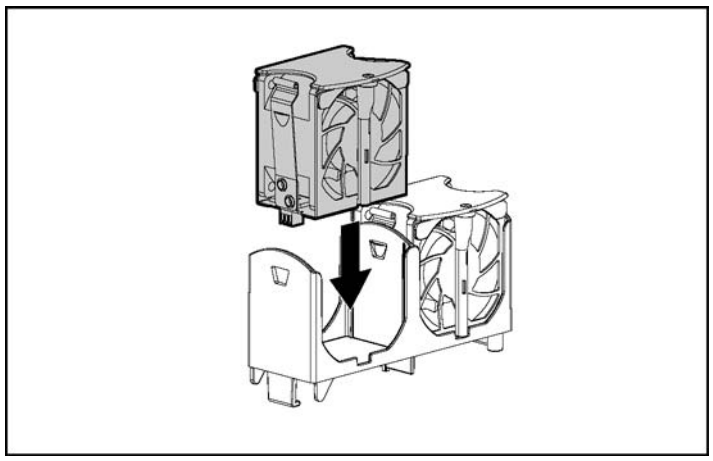
Installing redundant hot-plug fans

For information on hot-plug fan locations, refer to "Identifying Hot-Plug Fans (on page 29)."

1. Extend the server from the rack, if applicable ("Extending the server from the rack" on page 37).
2. Remove the access panel.

WARNING: The potential for personal injury exists if a hot surface is contacted. Use caution while performing hot-plug procedures.

3. Install the fan.



4. Be sure that the fan LED is green ("Hot-plug fan LED" on page 30).
5. Install the access panel ("Installing the access panel" on page 39).
6. Be sure that the front panel internal health LED is green ("Front panel LEDs and buttons" on page 11).

Battery-backed write cache option

NOTE: This feature applies only to SCSI models.

Along with the cache module, the battery pack provides transportable data protection, increases overall controller performance, and maintains any cached data for up to 72 hours. The NiMH batteries in the battery pack are continuously recharged through a trickle-charging process whenever the system power is on.

For information on BBWC LEDs, refer to "Battery-backed write cache LEDs (on page 32)" and "Battery-backed write cache LED statuses (on page 32)."

CAUTION: To prevent a server malfunction or damage to the equipment, do not add or remove the battery pack while an array capacity expansion, RAID level migration, or stripe size migration is in progress.

CAUTION: After the server is powered down, wait 15 seconds and then check the amber LED before unplugging the cable from the cache module. If the amber LED blinks after 15 seconds, do not remove the cable from the cache module. The cache module is backing up data, and data will be lost if the cable is detached.

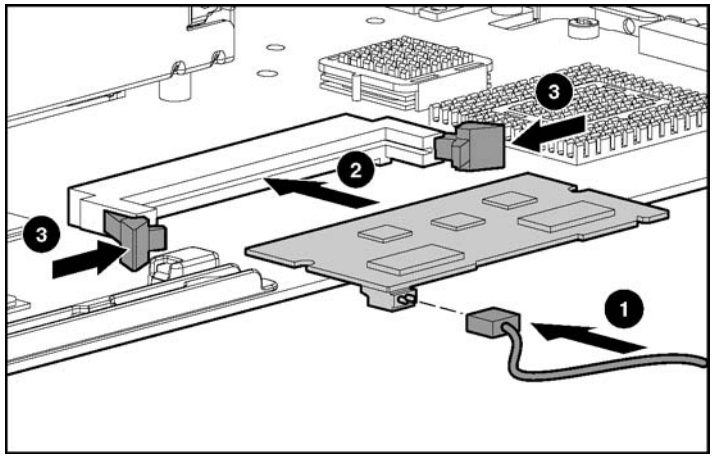
IMPORTANT: The battery pack may have a low charge when installed. In this case, a POST error message is displayed when the server is powered up, indicating that the battery pack is temporarily disabled. No action is necessary on your part. The internal circuitry automatically recharges the batteries and enables the battery pack. This process may take up to 4 hours. During this time, the cache module will function properly, but without the performance advantage of the battery pack.

NOTE: The data protection and the time limit also apply if a power outage occurs. When power is restored to the system, an initialization process writes the preserved data to the hard drives.

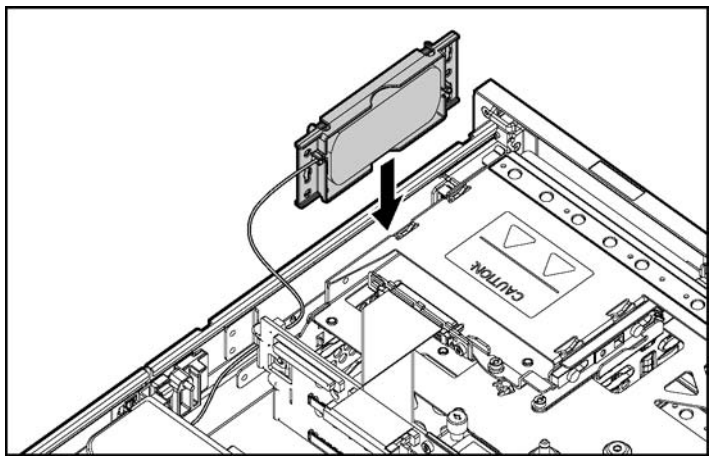
To install the BBWC:

1. Power down the server ("Powering down the server" on page 35).
2. Extend the server from the rack, if applicable ("Extending the server from the rack" on page 37).
3. Remove the access panel.
4. Remove the front fan bracket ("Front fan bracket" on page 43).
5. Remove the PCI riser cage ("Removing the PCI riser cage" on page 40).

6. Connect the cable to the cache module and install the cache module.



7. Route the cable along the system board.
8. Install the battery pack assembly into the server.



9. Install the PCI riser cage ("Installing the PCI riser cage" on page 41).
10. Install the front fan bracket ("Front fan bracket" on page 43).
11. Install the access panel ("Installing the access panel" on page 39).
12. Power up the server ("Powering up the server" on page 35).

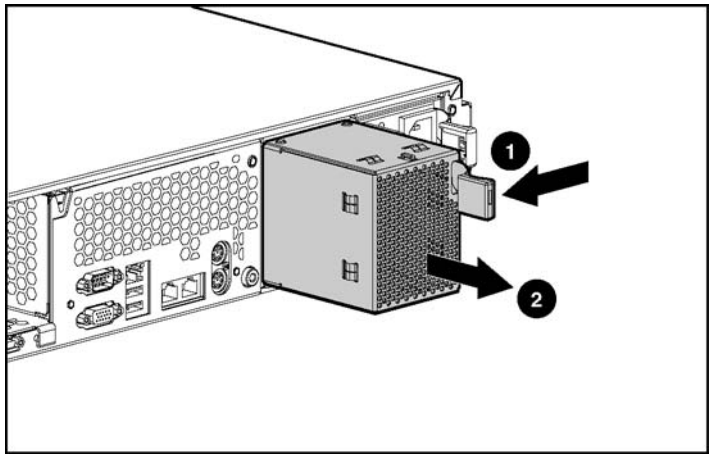
Refer to the option documentation for more information.

Redundant hot-plug AC power supply option

CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

1. Access the product rear panel ("Accessing the product rear panel" on page 39).
2. Remove the power supply blank.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the power supply or power supply blank to cool before touching it.



3. Slide the power supply into the power supply bay.
4. Connect the power cord to the power supply.
5. Route the power cord through the cable management arm or power cord anchor.

NOTE: If using the power cord anchor, be sure to leave enough slack in the power cord so that the redundant power supply can be removed without disconnecting the power cord from the primary power supply.

6. Reposition the cable management arm into the operating position.
7. Connect the power cord to the power source.
8. Be sure that the power supply LED is green.
9. Be sure that the front panel external health LED is green ("Front panel LEDs and buttons" on page 11).

Expansion board options

NOTE: This procedure shows images of the SCSI model server, but it also applies to the SAS model server.

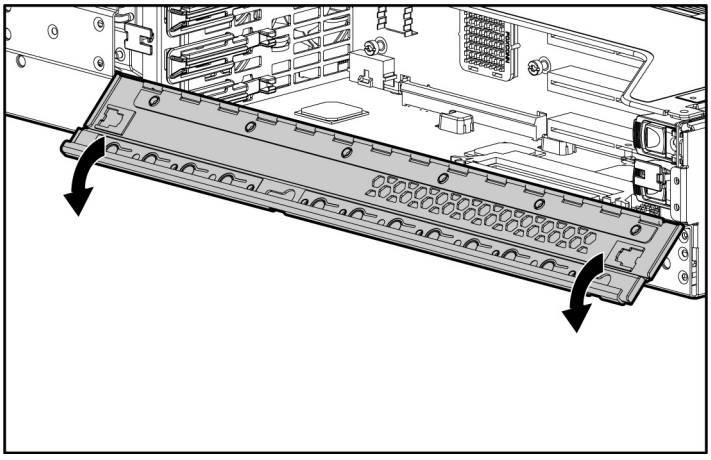
The server supports PCI and PCI-X expansion boards.

For instructions on installing a RILOE II board, refer to the *HP Remote Insight Lights-Out Edition II User Guide* on the Documentation CD.

IMPORTANT: The optional RILOE II board can be installed only in slot 3. If you plan to install a RILOE II board in the future, leave slot 3 unpopulated.

1. Power down the server ("Powering down the server" on page 35).
2. Extend or remove the server from the rack ("Extending the server from the rack" on page 37).
3. Remove the access panel.

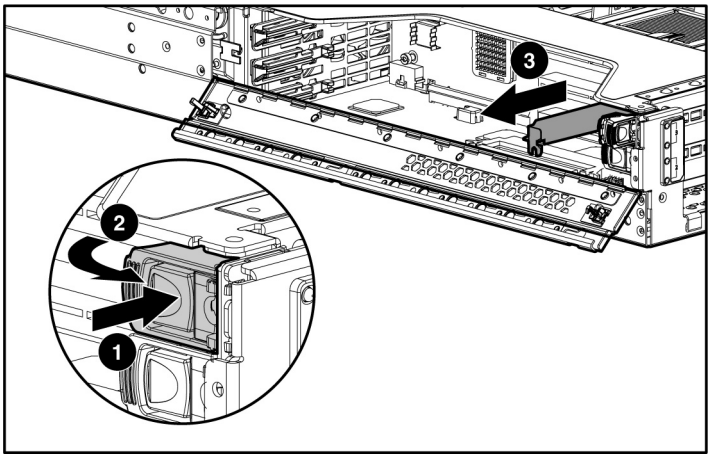
4. Open the PCI riser cage door.



CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all PCI slots have either an expansion slot cover or an expansion board installed.

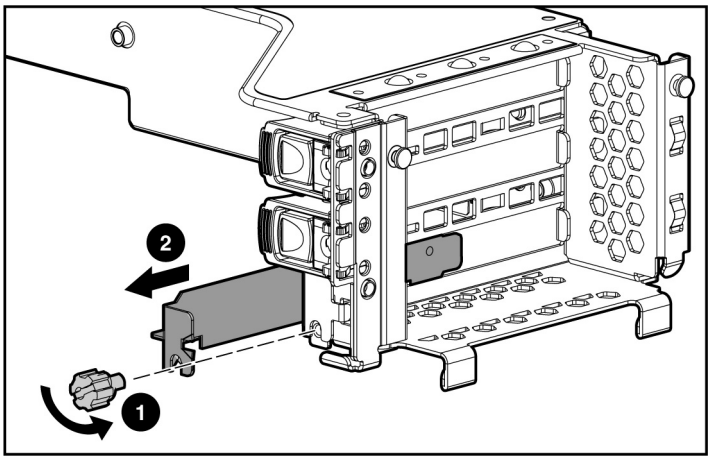
5. Perform one of the following:

   a. If you are installing an expansion board in slot 1 or 2, remove the expansion slot cover.

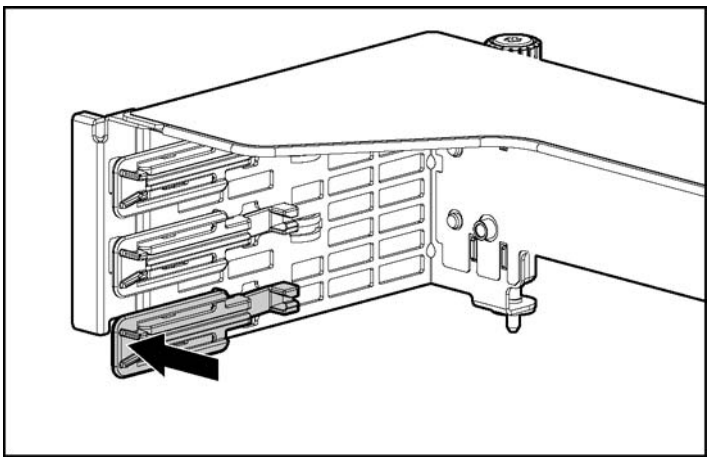


   b. If you are installing an expansion board in slot 3:

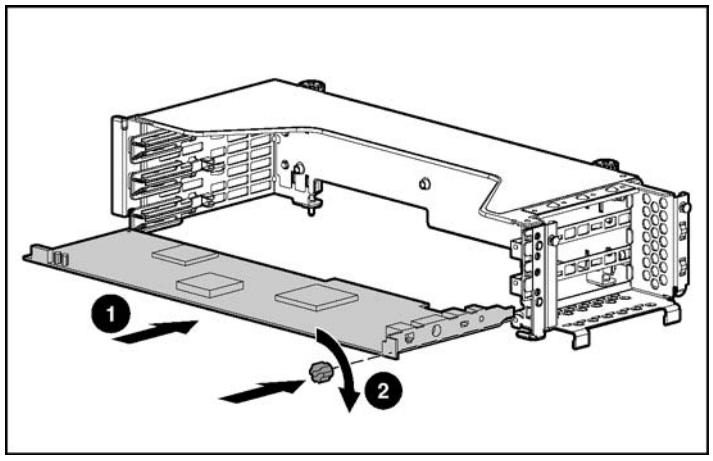
– Remove the PCI riser cage ("Removing the PCI riser cage" on page 40).
– Remove the expansion slot cover.



6. Unlock the PCI retaining clip.



7. Install the expansion board.



8. Lock the PCI retaining clip.
9. Install the PCI riser cage ("Installing the PCI riser cage" on page 41) if you installed the expansion board in slot 3.
10. Connect any required internal or external cables to the expansion board. Refer to the documentation that ships with the expansion board for details.
11. Close the PCI riser cage door.
12. Install the access panel ("Installing the access panel" on page 39).
13. Power up the server ("Powering up the server" on page 35).

Server cabling

In this section

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Cabling

This section provides guidelines that help you make informed decisions about cabling the server and hardware options to optimize performance.

For information on cabling the optional RILOE II board, refer to the *HP Remote Insight Lights-Out Edition II User Guide* on the Documentation CD.

For information on cabling peripheral components, refer to the white paper on high-density deployment in HP or Compaq branded racks on the HP website (http://www.hp.com).

SAS model cabling

List of topics:

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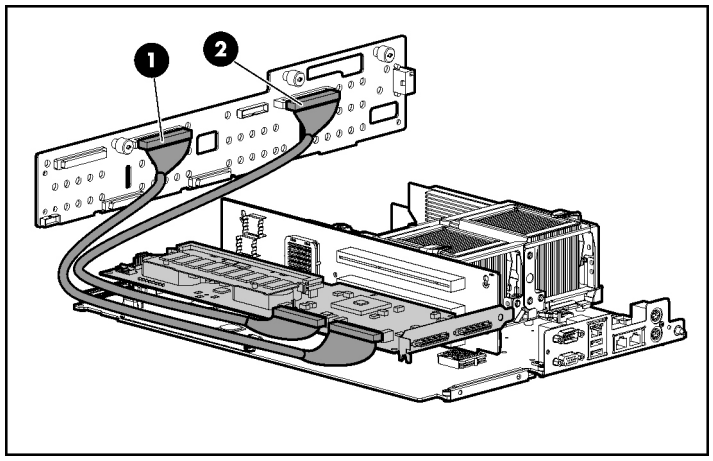
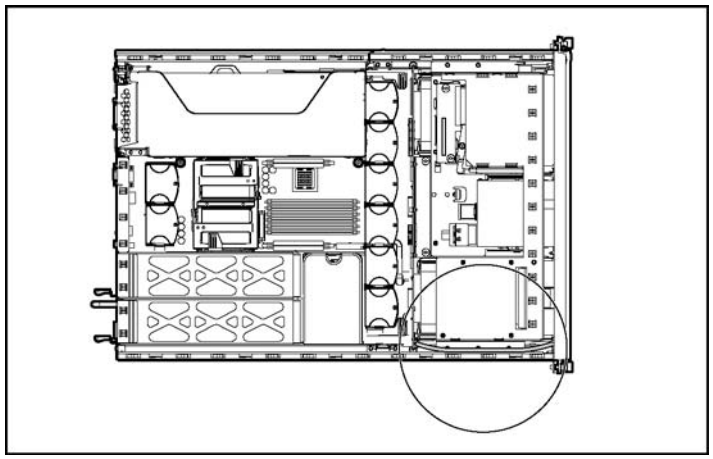
SAS hard drive cabling

The HP ProLiant DL385 Server SAS model uses a serial attached SCSI bus to connect SAS hard drives on a SAS backplane to a PCI SAS controller. In a SAS environment, each hard drive has a direct connection to the SAS controller. Two cables connect the PCI SAS controller to the SAS backplane. Each cable controls four SAS drives.

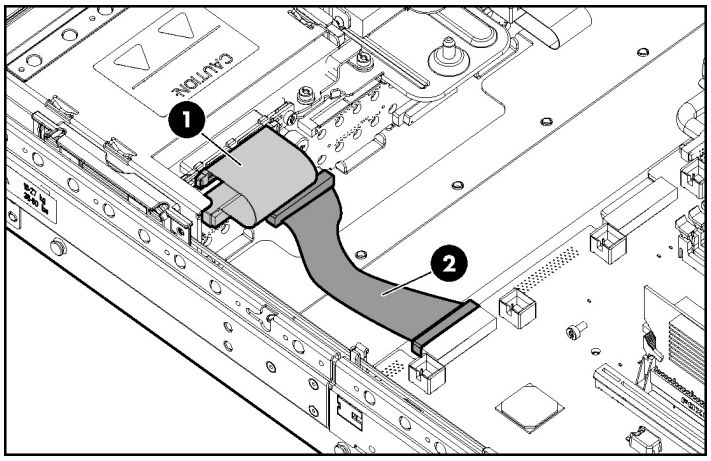


USB cabling

The USB cable connects the front panel USB connector to the SAS backplane.

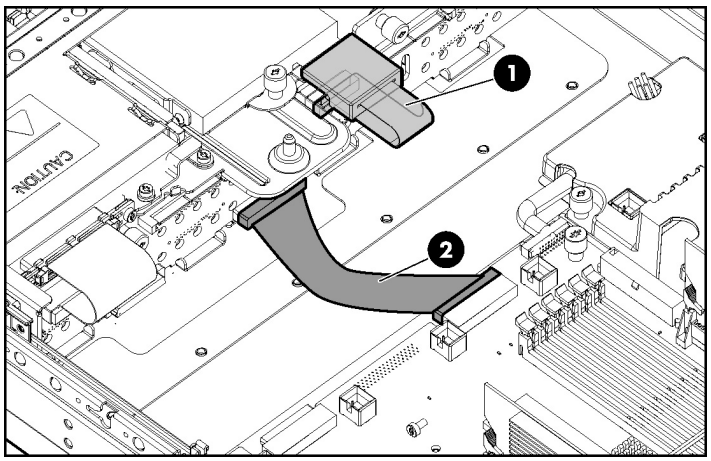


DVD/CD-ROM drive cabling



Item	Cable Description
1	DVD/CD-ROM drive cable
2	DVD/CD-ROM drive system cable

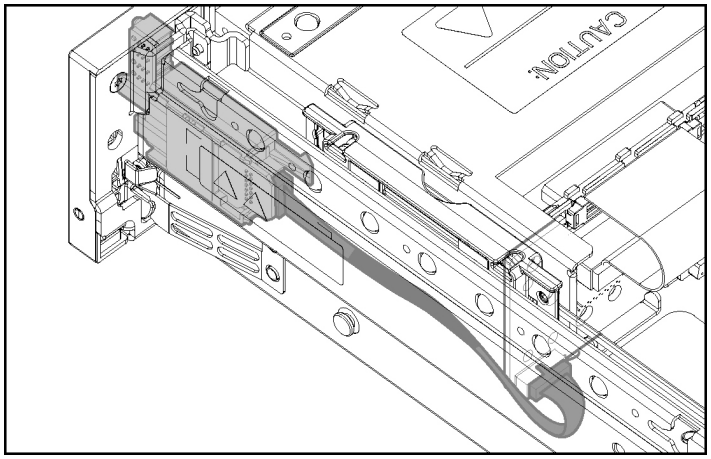
Diskette drive cabling



Item	Cable Description
1	Diskette drive cable
2	Diskette drive system cable

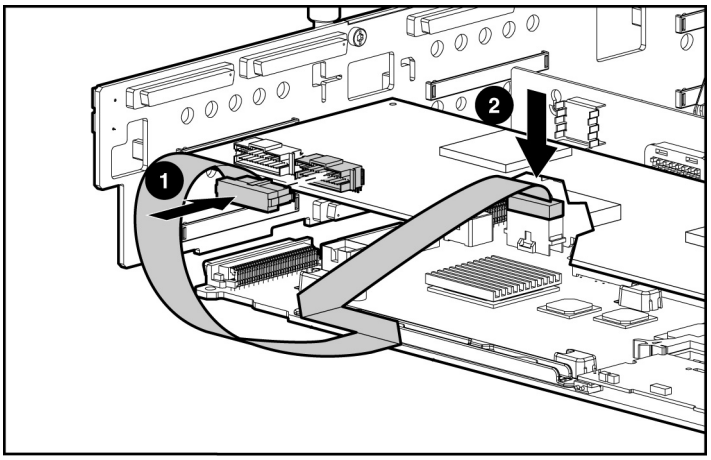
Power button/LED cabling

The power button/LED cable connects the power button/LED board to the SAS backplane.

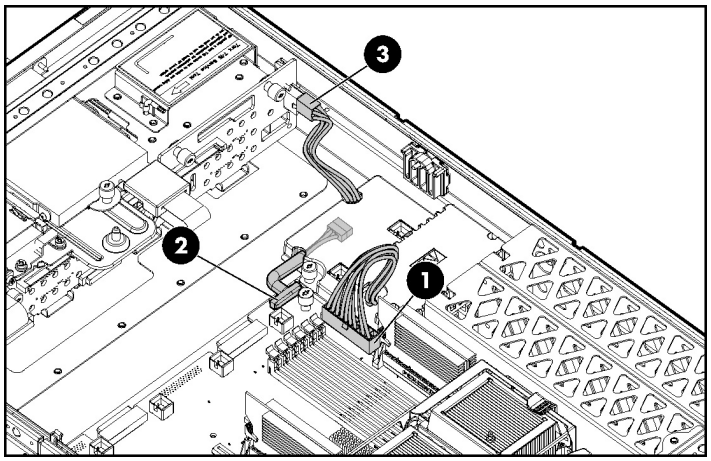


RILOE cabling (SAS)

The 30-pin Remote Insight cable ships with the RILOE II cable kit. For more information, refer to the *Remote Insight Lights-Out Edition II User Guide* on the Documentation CD.



Internal power cabling



Item	Description
1	System power cable
2	Power supply signal cable
3	SAS power cable

SCSI model cabling

List of topics:

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Embedded duplex SCSI cabling 92
PCI simplex SCSI cabling 93
PCI duplex SCSI cabling 94
Mixed duplex SCSI cabling 94
Installing the SCSI terminator board 96
Removing the SCSI terminator board 97
USB cabling 98
DVD/CD-ROM drive cabling 99

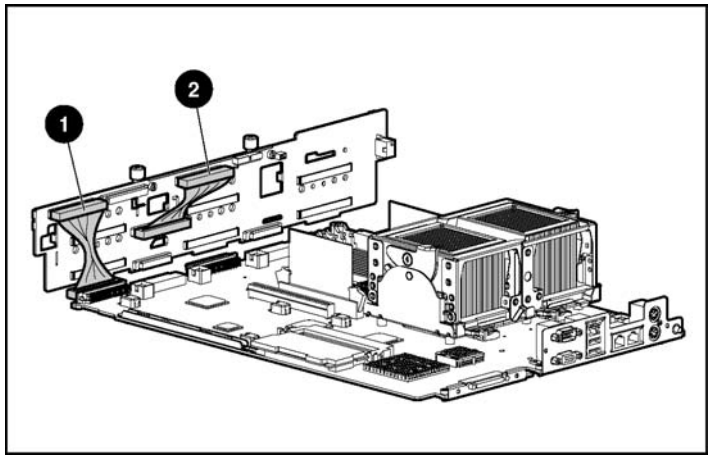
Diskette drive cabling 99
Power button/LED cabling 100
RILOE cabling (SCSI) 101
Internal power cabling 101

IMPORTANT: If a simplex or duplex cabling configuration is not cabled correctly, the SCSI configuration error LED will illuminate. Refer to "SCSI Backplane LEDs (on page 23)" to locate the LED.

NOTE: The server ships with two identical short SCSI cables. Two optional long SCSI cables may be obtained for PCI Array Controllers. One optional terminator board may be obtained to support duplex SCSI configurations.

Embedded simplex SCSI cabling

In the embedded simplex cabling configuration, the embedded Smart Array 6i Controller controls up to six hard drives through one SCSI bus. The server ships standard with this configuration.



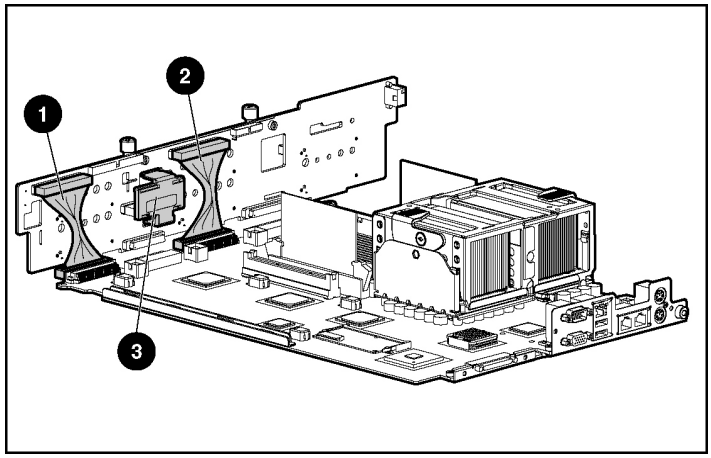
NOTE: The short SCSI cables are identical.

Item	Component description	SCSI IDs managed
1	Short SCSI cable	0, 1, 2, 3, 4, 5
2	Short SCSI cable used to jumper the two SCSI buses together	N/A

Embedded duplex SCSI cabling

In the embedded duplex cabling configuration, the embedded Smart Array 6i Controller controls up to six hard drives through two SCSI buses: one bus with up to two drives and the other bus with up to four drives.

NOTE: This specific cabling configuration does not support external VHDCI.



NOTE: Optional SCSI terminator board and optional long SCSI cables are available in the SCSI Configuration Option Kit.

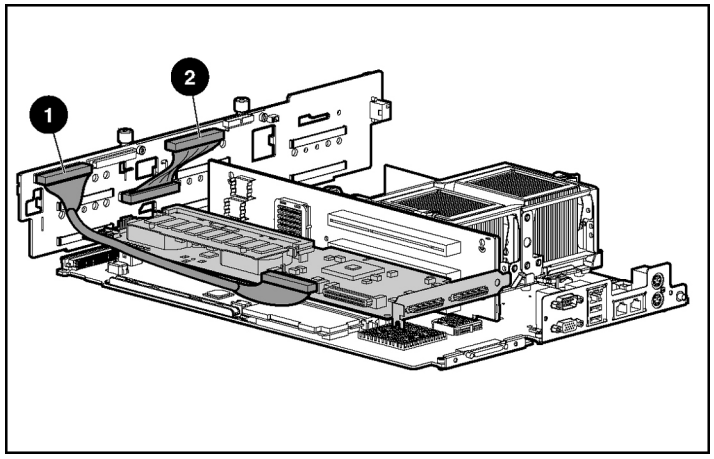
NOTE: The short SCSI cables are identical.

Item	Component description	SCSI IDs managed
1	Short SCSI cable	0, 1
2	Short SCSI cable	2, 3, 4, 5
3	Optional terminator board	N/A

Refer to "Installing the SCSI terminator board (on page 96)" for SCSI terminator board installation procedures.

PCI simplex SCSI cabling

In the PCI simplex cabling configuration, an optional PCI array controller controls up to six hard drives through one SCSI bus.

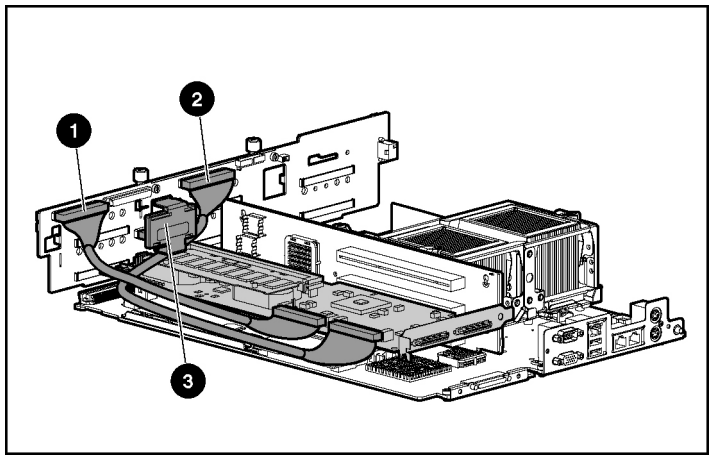


NOTE: Optional SCSI terminator board and optional long SCSI cables are available in the SCSI Configuration Option Kit.

Item	Component description	SCSI IDs managed
1	Optional long SCSI cable	0, 1, 2, 3, 4, 5
2	Short SCSI cable used to jumper the two SCSI buses together	N/A

PCI duplex SCSI cabling

In the PCI duplex cabling configuration, an optional PCI array controller controls up to six hard drives through two SCSI buses: one bus with up to two drives and one bus with up to four drives.



NOTE: Optional SCSI terminator board and optional long SCSI cables are available in the SCSI Configuration Option Kit.

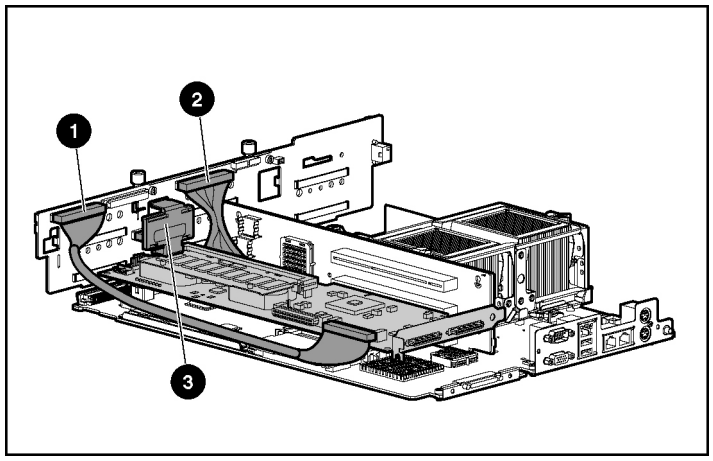
Item	Component description	SCSI IDs managed
1	Optional long SCSI cable	0, 1
2	Optional long SCSI cable	2, 3, 4, 5
3	Optional terminator board	N/A

Refer to "Installing the SCSI terminator board (on page 96)" for SCSI terminator board installation procedures.

Mixed duplex SCSI cabling

In the mixed duplex SCSI cabling configuration, an optional PCI array controller controls up to six hard drives through two SCSI buses: one bus with up to two drives and one bus with up to four drives. Two configuration options are available for mixed duplex SCSI cabling.

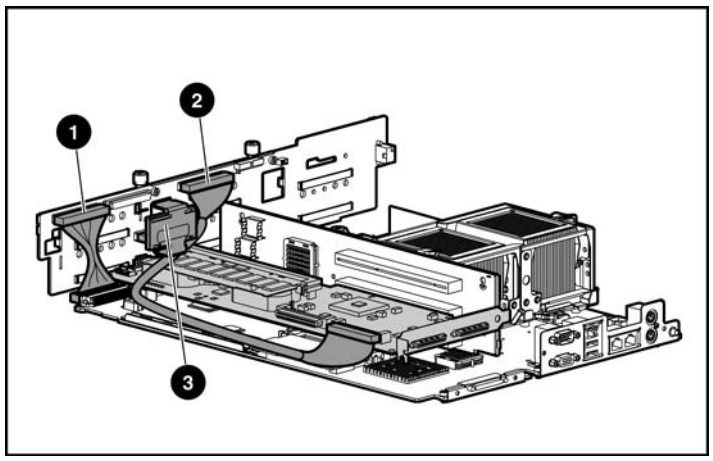
NOTE: This specific cabling configuration does not support external VHDCI.



NOTE: Optional SCSI terminator board and optional long SCSI cables are available in the SCSI Configuration Option Kit.

Item	Component description	SCSI IDs managed
1	Optional long SCSI cable	0, 1
2	Short SCSI cable	2, 3, 4, 5
3	Optional terminator board	N/A

NOTE: This specific cabling configuration supports external VHDCI.



NOTE: Optional SCSI terminator board and optional long SCSI cables are available in the SCSI Configuration Option Kit.

Item	Component description	SCSI IDs managed
1	Short SCSI cable	0, 1
2	Optional long SCSI cable	2, 3, 4, 5
3	Optional terminator board	N/A

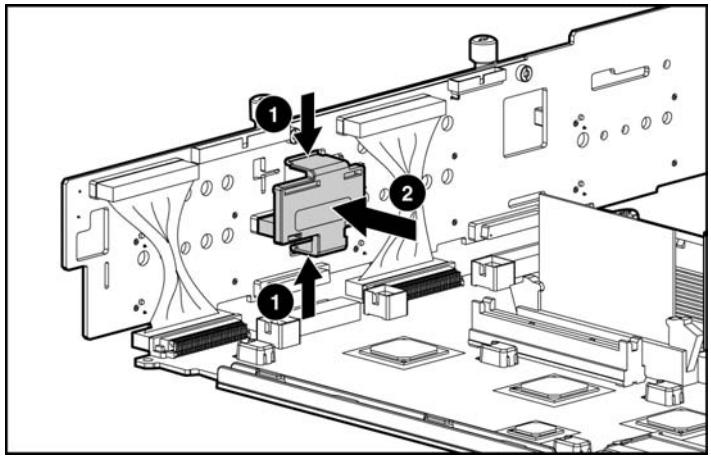
Installing the SCSI terminator board

1. Power down the server ("Powering down the server" on page 35).
2. Extend or remove the server from the rack ("Extending the server from the rack" on page 37).
3. Remove the access panel.
4. Remove the front fan bracket ("Front fan bracket" on page 43).

IMPORTANT: For this procedure, you do not need to remove the hot-plug fans from the front fan bracket. When reinstalling the front fan bracket, press the top of each fan to be sure it seats securely.

NOTE: For more information on preparing the server for installation or removal procedures, refer to the Documentation CD.

5. Install the SCSI terminator board.



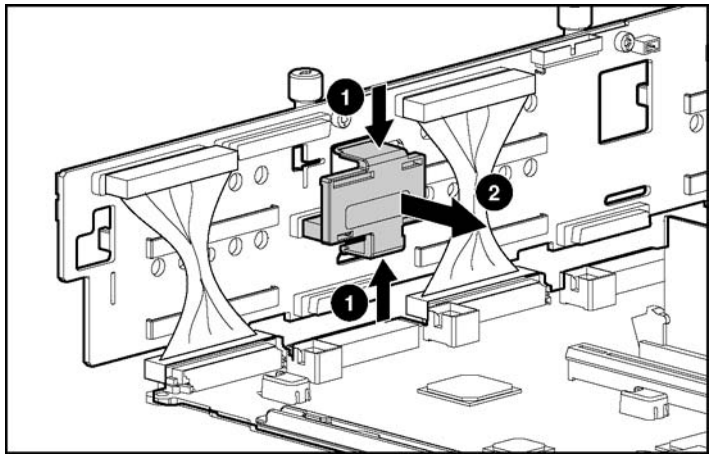
Removing the SCSI terminator board

1. Power down the server ("Powering down the server" on page 35).
2. Extend or remove the server from the rack ("Extending the server from the rack" on page 37).
3. Remove the access panel.
4. Remove the front fan bracket ("Front fan bracket" on page 43).

IMPORTANT: For this procedure, you do not need to remove the hot-plug fans from the front fan bracket. When reinstalling the front fan bracket, press the top of each fan to be sure it seats securely.

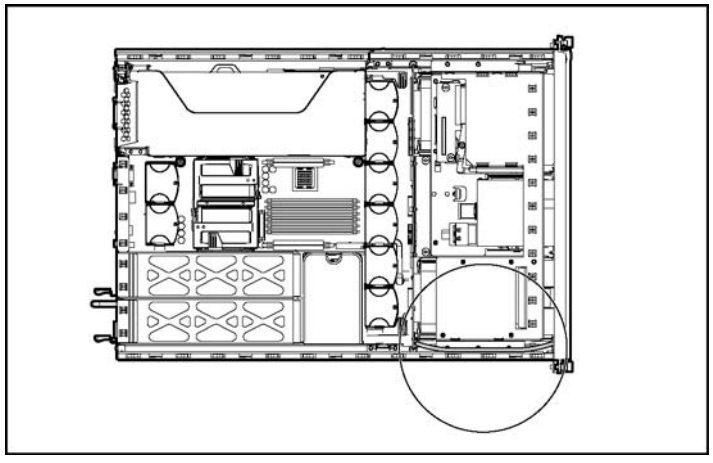
NOTE: For more information on preparing the server for installation or removal procedures, refer to the Documentation CD.

5. Remove the SCSI terminator board.

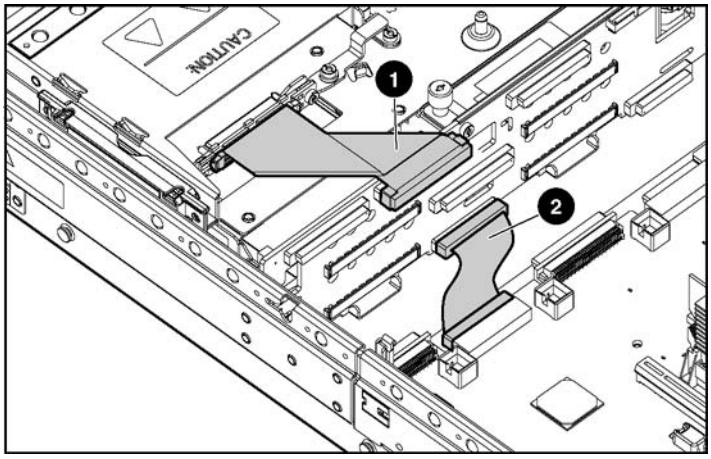


USB cabling

The USB cable connects the front panel USB connector to the SCSI backplane.

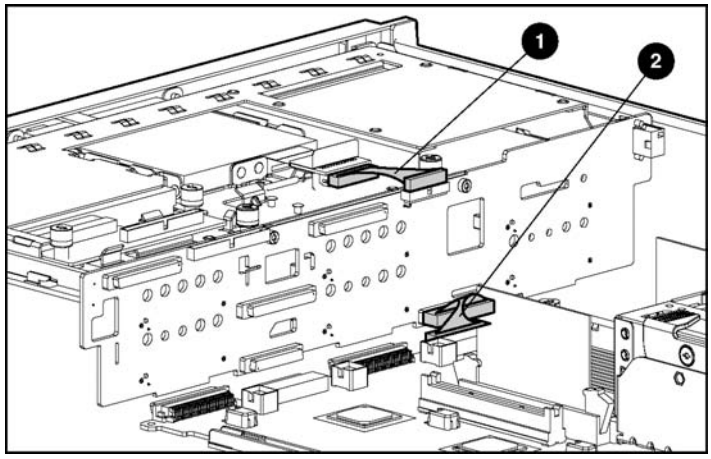


DVD/CD-ROM drive cabling



Item	Cable description
1	DVD/CD-ROM drive cable
2	DVD/CD-ROM drive system cable

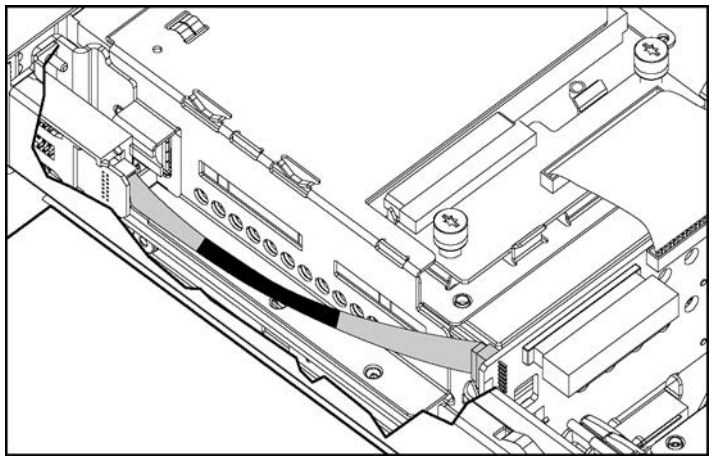
Diskette drive cabling



Item	Cable description
1	Diskette drive cable
2	Diskette drive system cable

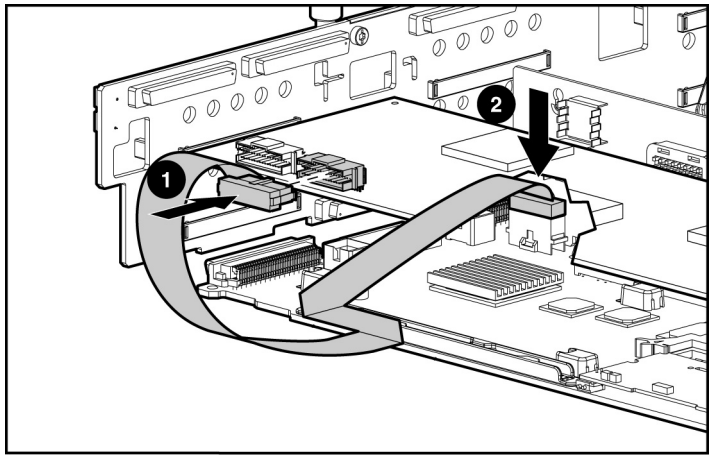
Power button/LED cabling

The power button/LED cable connects the power button/LED board to the SCSI backplane.

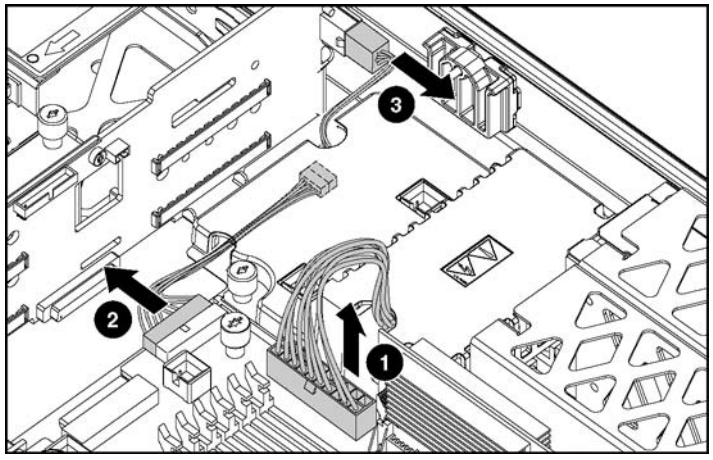


RILOE cabling (SCSI)

The 30-pin Remote Insight cable ships with the RILOE II cable kit. For more information, refer to the *Remote Insight Lights-Out Edition II User Guide* on the Documentation CD.



Internal power cabling



Item	Description
1	System power cable
2	Power supply signal cable
3	SCSI power cable

Server software and configuration utilities

In this section

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Configuration tools

List of tools:

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HP ROM-Based Setup Utility 105
Array Configuration Utility 108
Option ROM Configuration for Arrays 108
HP ProLiant Essentials Rapid Deployment Pack 109
Re-entering the server serial number and product ID 109

SmartStart software

SmartStart is a collection of software that optimizes single-server setup, providing a simple and consistent way to deploy server configuration. SmartStart has been tested on many ProLiant server products, resulting in proven, reliable configurations.

SmartStart assists the deployment process by performing a wide range of configuration activities, including:

- Configuring hardware using embedded configuration utilities, such as RBSU and ORCA
- Preparing the system for installing "off-the-shelf" versions of leading operating system software

- Installing optimized server drivers, management agents, and utilities automatically with every assisted installation
- Testing server hardware using the Insight Diagnostics Utility ("HP Insight Diagnostics" on page 118)
- Installing software drivers directly from the CD. With systems that have internet connection, the SmartStart Autorun Menu provides access to a complete list of ProLiant system software.
- Enabling access to the Array Configuration Utility (on page 108), Array Diagnostic Utility (on page 118), and Erase Utility (on page 112)

SmartStart is included in the HP ProLiant Essentials Foundation Pack. For more information about SmartStart software, refer to the HP ProLiant Essentials Foundation Pack or the HP website (http://www.hp.com/servers/smartstart).

SmartStart Scripting Toolkit

The SmartStart Scripting Toolkit is a server deployment product that delivers an unattended automated installation for high-volume server deployments. The SmartStart Scripting Toolkit is designed to support ProLiant BL, ML, and DL servers. The toolkit includes a modular set of utilities and important documentation that describes how to apply these new tools to build an automated server deployment process.

Using SmartStart technology, the Scripting Toolkit provides a flexible way to create standard server configuration scripts. These scripts are used to automate many of the manual steps in the server configuration process. This automated server configuration process cuts time from each server deployed, making it possible to scale server deployments to high volumes in a rapid manner.

For more information, and to download the SmartStart Scripting Toolkit, refer to the HP website (http://www.hp.com/servers/sstoolkit).

Configuration Replication Utility

ConRep is shipped in the SmartStart Scripting Toolkit and is a program that works with RBSU to replicate hardware configuration on ProLiant servers. This utility is run during State 0, Run Hardware Configuration Utility, when doing a scripted server deployment. ConRep reads the state of the system environment variables to determine the configuration and then writes the results to an editable script file. This file can then be deployed across multiple servers with similar hardware and software components. For more information, refer to the *SmartStart Scripting Toolkit User Guide* on the HP website (http://h18004.www1.hp.com/products/servers/management/toolkit/documentation.html).

ROM-based enhancements overview

Some HP ProLiant servers have new ROM-based enhancements available, including:

- An auto-configuration process that, in most cases, automatically configures the entire system without intervention
- The System Maintenance menu, which provides embedded server diagnostics and Inspect Utility information through Embedded Server Setup
- A new erase option for RBSU, which erases the system configuration and boot drive

For details about which features the server supports, refer to the server-specific documentation.

HP ROM-Based Setup Utility

RBSU, an embedded configuration utility, performs a wide range of configuration activities that may include:

- Configuring system devices and installed options
- Displaying system information
- Selecting the primary boot controller

- Configuring memory options
- Language selection

For more information on RBSU, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD or the HP website (http://www.hp.com/servers/smartstart).

Using RBSU

The first time you power up the server, the system prompts you to enter RBSU and select a language. Default configuration settings are made at this time and can be changed later. Most of the features in RBSU are not required to set up the server.

To navigate RBSU, use the following keys:

- To access RBSU, press the **F9** key during power up when prompted in the upper right corner of the screen.
- To navigate the menu system, use the arrow keys.
- To make selections, press the **Enter** key.

IMPORTANT: RBSU automatically saves settings when you press the **Enter** key. The utility does not prompt you for confirmation of settings before you exit the utility. To change a selected setting, you must select a different setting and press the **Enter** key.

Auto-configuration process

The auto-configuration process automatically runs when you boot the server for the first time. During the power-up sequence, the system ROM automatically configures the entire system without needing any intervention. During this process, the ORCA utility, in most cases, automatically configures the array to a default setting based on the number of drives connected to the server.

NOTE: The server may not support all the following examples.

NOTE: If the boot drive is not empty or has been written to in the past, ORCA does not automatically configure the array. You must run ORCA to configure the array settings.

Drives installed	Drives used	RAID level
1	1	RAID 0
2	2	RAID 1
3, 4, 5, or 6	3, 4, 5, or 6	RAID 5
More than 6	0	None

To change any ORCA default settings and override the auto-configuration process, press the **F8** key when prompted.

By default, the auto-configuration process configures the system for the English language. To change any default settings in the auto-configuration process (such as the settings for language, operating system, and primary boot controller), execute RBSU by pressing the **F9** key when prompted. After the settings are selected, exit RBSU and allow the server to reboot automatically.

For more information, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD or the HP website (http://www.hp.com/servers/smartstart).

Boot options

After the auto-configuration process completes, or after the server reboots upon exit from RBSU, the POST sequence runs, and then the boot option screen is displayed. This screen is visible for several seconds before the system attempts to boot from either a diskette, CD, or hard drive. During this time, the menu on the screen allows you to install an operating system or make changes to the server configuration in RBSU.

BIOS Serial Console

BIOS Serial Console allows you to configure the serial port to view POST error messages and run RBSU remotely through a serial connection to the server COM port. The server that you are remotely configuring does not require a keyboard and mouse.

For more information about BIOS Serial Console, refer to the *BIOS Serial Console User Guide* on the Documentation CD or the HP website (http://www.hp.com/servers/smartstart).

Array Configuration Utility

ACU is a browser-based utility with the following features:

- Runs as a local application or remote service
- Supports online array capacity expansion, logical drive extension, assignment of online spares, and RAID or stripe size migration
- Suggests the optimum configuration for an unconfigured system
- Provides different operating modes, enabling faster configuration or greater control over the configuration options
- Remains available any time that the server is on
- Displays on-screen tips for individual steps of a configuration procedure

For optimum performance, the minimum display settings are 800 × 600 resolution and 256 colors. Servers running Microsoft® operating systems require Internet Explorer 5.5 (with Service Pack 1) or later. For Linux servers, refer to the README.TXT file for additional browser and support information.

For more information, refer to the *HP Array Configuration Utility User Guide* on the Documentation CD or the HP website (http://www.hp.com).

Option ROM Configuration for Arrays

Before installing an operating system, you can use the ORCA utility to create the first logical drive, assign RAID levels, and establish online spare configurations.

The utility also provides support for the following functions:

- Reconfiguring one or more logical drives
- Viewing the current logical drive configuration
- Deleting a logical drive configuration
- Setting the controller to be the boot controller

If you do not use the utility, ORCA will default to the standard configuration.

For more information regarding array controller configuration, refer to the controller user guide.

For more information regarding the default configurations that ORCA uses, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD.

HP ProLiant Essentials Rapid Deployment Pack

The RDP software is the preferred method for rapid, high-volume server deployments. The RDP software integrates two powerful products: Altiris Deployment Solution and the HP ProLiant Integration Module.

The intuitive graphical user interface of the Altiris Deployment Solution console provides simplified point-and-click and drag-and-drop operations that enable you to deploy target servers, including server blades, remotely. It enables you to perform imaging or scripting functions and maintain software images.

For more information about the RDP, refer to the HP ProLiant Essentials Rapid Deployment Pack CD or refer to the HP website (http://www.hp.com/servers/rdp).

Re-entering the server serial number and product ID

After you replace the system board, you must re-enter the server serial number and the product ID.

1. During the server startup sequence, press the **F9** key to access RBSU.
2. Select the **System Options** menu.
3. Select **Serial Number**. The following warning is displayed:

   ```
   WARNING! WARNING! WARNING! The serial number is loaded
   into the system during the manufacturing process and
   should NOT be modified. This option should only be used
   by qualified service personnel. This value should always
   match the serial number sticker located on the chassis.
   ```

4. Press the **Enter** key to clear the warning.
5. Enter the serial number and press the **Enter** key.
6. Select **Product ID**.

7. Enter the product ID and press the **Enter** key.
8. Press the **Esc** key to close the menu.
9. Press the **Esc** key to exit RBSU.
10. Press the **F10** key to confirm exiting RBSU. The server will automatically reboot.

Management tools

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StorageWorks library and tape tools....113
Management Agents....113
HP Systems Insight Manager....113
Redundant ROM support....114
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Automatic Server Recovery

ASR is a feature that causes the system to restart when a catastrophic operating system error occurs, such as a blue screen, ABEND, or panic. A system fail-safe timer, the ASR timer, starts when the System Management driver, also known as the Health Driver, is loaded. When the operating system is functioning properly, the system periodically resets the timer. However, when the operating system fails, the timer expires and restarts the server.

ASR increases server availability by restarting the server within a specified time after a system hang or shutdown. At the same time, the HP SIM console notifies you by sending a message to a designated pager number that ASR has restarted the system. You can disable ASR from the HP SIM console or through RBSU.

ROMPaq utility

Flash ROM enables you to upgrade the firmware (BIOS) with system or option ROMPaq utilities. To upgrade the BIOS, insert a ROMPaq diskette into the diskette drive and boot the system.

The ROMPaq utility checks the system and provides a choice (if more than one exists) of available ROM revisions. This procedure is the same for both system and option ROMPaq utilities.

For more information about the ROMPaq utility, refer to the HP website (http://www.hp.com/servers/manage).

System Online ROM flash component utility

The Online ROM Flash Component Utility enables system administrators to efficiently upgrade system or controller ROM images across a wide range of servers and array controllers. This tool has the following features:

- Works offline and online
- Supports Microsoft® Windows NT®, Windows® 2000, Windows® Server 2003, Novell Netware, and Linux operating systems

  IMPORTANT: This utility supports operating systems that may not be supported by the server. For operating systems supported by the server, refer to the HP website (http://www.hp.com/go/supportos).

- Integrates with other software maintenance, deployment, and operating system tools
- Automatically checks for hardware, firmware, and operating system dependencies, and installs only the correct ROM upgrades required by each target server

To download the tool and for more information, refer to the HP website (http://h18000.www1.hp.com/support/files/index.html).

Integrated Lights-Out technology

The iLO subsystem is a standard component of selected ProLiant servers that provides server health and remote server manageability. The iLO subsystem includes an intelligent microprocessor, secure memory, and a dedicated network interface. This design makes iLO independent of the host server and its operating system. The iLO subsystem provides remote access to any authorized network client, sends alerts, and provides other server management functions.

Using iLO, you can:

- Remotely power up, power down, or reboot the host server.
- Send alerts from iLO regardless of the state of the host server.
- Access advanced troubleshooting features through the iLO interface.
- Diagnose iLO using HP SIM through a web browser and SNMP alerting.

For more information about iLO features, refer to the *Integrated Lights-Out User Guide* on the Documentation CD or on the HP website (http://www.hp.com/servers/lights-out).

Erase Utility

CAUTION: Perform a backup before running the System Erase Utility. The utility sets the system to its original factory state, deletes the current hardware configuration information, including array setup and disk partitioning, and erases all connected hard drives completely. Refer to the instructions for using this utility.

Run the Erase Utility if you need to erase the system for the following reasons:

- You want to install a new operating system on a server with an existing operating system.
- You want to change the operating system selection.
- You encounter a failure-causing error during the SmartStart installation.
- You encounter an error when completing the steps of a factory-installed operating system installation.

The Erase Utility can be accessed from the Software and Drivers Download website (http://www.hp.com/go/support) or the **Maintenance Utilities** menu of the SmartStart CD ("SmartStart software" on page 103).

StorageWorks library and tape tools

HP StorageWorks L&TT provides functionality for firmware downloads, verification of device operation, maintenance procedures, failure analysis, corrective service actions, and some utility functions. It also provides seamless integration with HP hardware support by generating and emailing support tickets that deliver a snapshot of the storage system.

For more information, and to download the utility, refer to the StorageWorks L&TT website (http://h18006.www1.hp.com/products/storageworks/ltt).

Management Agents

Management Agents provide the information to enable fault, performance, and configuration management. The agents allow easy manageability of the server through HP SIM software, and third-party SNMP management platforms. Management Agents are installed with every SmartStart assisted installation or can be installed through the HP PSP. The Systems Management homepage provides status and direct access to in-depth subsystem information by accessing data reported through the Management Agents. For additional information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack or the HP website (http://www.hp.com/servers/manage).

HP Systems Insight Manager

HP SIM is a web-based application that allows system administrators to accomplish normal administrative tasks from any remote location, using a web browser. HP SIM provides device management capabilities that consolidate and integrate management data from HP and third-party devices.

IMPORTANT: You must install and use HP SIM to benefit from the Pre-Failure Warranty for processors, hard drives, and memory modules.

For additional information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack or the HP SIM website (http://www.hp.com/go/hpsim).

Redundant ROM support

The server enables you to upgrade or configure the ROM safely with redundant ROM support. The server has a 4-MB ROM that acts as two, separate 2-MB ROMs. In the standard implementation, one side of the ROM contains the current ROM program version, while the other side of the ROM contains a backup version.

NOTE: The server ships with the same version programmed on each side of the ROM.

Safety and security benefits

When you flash the system ROM, ROMPaq writes over the backup ROM and saves the current ROM as a backup, enabling you to switch easily to the alternate ROM version if the new ROM becomes corrupted for any reason. This feature protects the existing ROM version, even if you experience a power failure while flashing the ROM.

Access to redundant ROM settings

To access the redundant ROM through RBSU:

1. Access RBSU by pressing the **F9** key during powerup when the prompt is displayed in the upper right corner of the screen.
2. Select **Advanced Options**.
3. Select **Redundant ROM Selection**.
4. Select the ROM version.
5. Press the **Enter** key.
6. Press the **Esc** key to exit the current menu or press the **F10** key to exit RBSU. The server restarts automatically.

To access the redundant ROM manually:

1. Power down the server ("Powering down the server" on page 35).
2. Remove the access panel.
3. Set positions 1, 5, and 6 of the system maintenance switch to On.
4. Install the access panel ("Installing the access panel" on page 39).
5. Power up the server ("Powering up the server" on page 35).
6. Wait for the server to emit two beeps.
7. Repeat steps 1 and 2.
8. Set positions 1, 5, and 6 of the system maintenance switch to Off.
9. Repeat steps 4 and 5.

When the server boots, the system identifies whether the current ROM bank is corrupt. If a corrupt ROM is detected, the system boots from the backup ROM and alerts you through POST or IML that the ROM bank is corrupt.

If both the current and backup versions of the ROM are corrupt, the server automatically enters ROMPaq disaster recovery mode.

System maintenance menu

The System Maintenance Menu is a new utility that replaces the legacy system-partition functionality supported on some ProLiant servers. This utility is embedded in the system ROM and provides access to server diagnostics, RBSU, and the Inspect Utility.

To access the System Maintenance Menu, press the **F10** key when prompted from the boot option screen ("Boot options" on page 107).

From the menu, you can select from the following utilities that are embedded in the system ROM:

- The ROM-Based Setup Utility ("HP ROM-Based Setup Utility" on page 105) performs a wide range of configuration activities, including configuring system devices and selecting operating systems and boot controllers.
- The ROM-Based Inspect Utility enables you to view system configuration information and save the information to a file on a diskette.

- The ROM-Based Diagnostic Utility provides a preboot method for quickly checking the validity of the three major sub-systems of the server (memory, CPU, and boot disk) needed to boot an operating system.

For more information on the System Maintenance Menu, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD.

iLO ROM-Based Setup Utility

HP recommends using iLO RBSU to configure and set up iLO. iLO RBSU is designed to assist you with setting up iLO on a network; it is not intended for continued administration.

To run iLO RBSU:

1. Restart or power up the server.
2. Press the **F8** key when prompted during POST. The iLO RBSU runs.
3. Enter a valid iLO user ID and password with the appropriate iLO privileges (**Administer User Accounts**, **Configure iLO Settings**). Default account information is located on the iLO Default Network Settings tag.
4. Make and save any necessary changes to the iLO configuration.
5. Exit iLO RBSU.

HP recommends using DNS/DHCP with iLO to simplify installation. If DNS/DHCP cannot be used, use the following procedure to disable DNS/DHCP and to configure the IP address and the subnet mask:

1. Restart or power up the server.
2. Press the **F8** key when prompted during POST. The iLO RBSU runs.
3. Enter a valid iLO user ID and password with the appropriate iLO privileges (**Administer User Accounts**, **Configure iLO Settings**). Default account information is located on the iLO Default Network Settings tag.
4. Select **Network**, **DNS/DHCP**, press the **Enter** key, and then select **DHCP Enable**. Press the spacebar to turn off DHCP. Be sure that DHCP Enable is set to Off and save the changes.

5. Select **Network**, **NIC and TCP/IP**, press the **Enter** key, and type the appropriate information in the IP Address, Subnet Mask, and Gateway IP Address fields.
6. Save the changes. The iLO system automatically resets to use the new setup when you exit iLO RBSU.

USB support

HP provides both standard USB support and legacy USB support. Standard support is provided by the operating system through the appropriate USB device drivers. HP provides support for USB devices before the operating system loading through legacy USB support, which is enabled by default in the system ROM. HP hardware supports USB version 1.1.

Legacy USB support provides USB functionality in environments where USB support is normally not available. Specifically, HP provides legacy USB functionality at:

- POST
- RBSU
- Diagnostics
- DOS
- Environments which do not support USB natively

For more information on ProLiant USB support, refer to the HP website (http://www.compaq.com/products/servers/platforms/usb-support.html).

Diagnostic tools

List of tools:

Survey Utility 118
Array Diagnostic Utility 118
HP Insight Diagnostics 118
Integrated Management Log 119

Survey Utility

Survey Utility, a feature within Insight Diagnostics, gathers critical hardware and software information on ProLiant servers.

This utility supports operating systems that may not be supported by the server. For operating systems supported by the server, refer to the HP website (http://www.hp.com/go/supportos).

If a significant change occurs between data-gathering intervals, the Survey Utility marks the previous information and overwrites the Survey text files to reflect the latest changes in the configuration.

Survey Utility is installed with every SmartStart-assisted installation or can be installed through the HP PSP.

Array Diagnostic Utility

ADU is tool that collects information about array controllers and generates a list of detected problems. ADU can be accessed from the SmartStart CD ("SmartStart software" on page 103) or downloaded from the HP website (http://www.hp.com).

HP Insight Diagnostics

HP Insight Diagnostics is a proactive server management tool, available in both offline and online versions, that provides diagnostics and troubleshooting capabilities to assist IT administrators who verify server installations, troubleshoot problems, and perform repair validation.

HP Insight Diagnostics Offline Edition performs various in-depth system and component testing while the OS is not running. To run this utility, launch the SmartStart CD.

HP Insight Diagnostics Online Edition is a web-based application that captures system configuration and other related data needed for effective server management. Available in Microsoft® Windows® and Linux versions, the utility helps to ensure proper system operation.

For more information or to download the utility, refer to the HP website (http://www.hp.com/servers/diags).

Integrated Management Log

The IML records hundreds of events and stores them in an easy-to-view form. The IML timestamps each event with 1-minute granularity.

You can view recorded events in the IML in several ways, including the following:

- From within HP SIM ("HP Systems Insight Manager" on page 113)
- From within Survey Utility (on page 118)
- From within operating system-specific IML viewers
  - For NetWare: IML Viewer
  - For Windows®: IML Viewer
  - For Linux: IML Viewer Application
- From within HP Insight Diagnostics (on page 118)

For more information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack.

Keeping the system current

List of tools:

Drivers 120
Resource Paqs 120
ProLiant Support Packs 120
Operating system version support 121
Change control and proactive notification 121
Natural language search assistant 121
Care Pack 121

Drivers

The server includes new hardware that may not have driver support on all operating system installation media.

If you are installing a SmartStart-supported operating system, use the SmartStart software (on page 103) and its Assisted Path feature to install the operating system and latest driver support.

> **NOTE:** If you are installing drivers from the SmartStart CD or the Software Maintenance CD, refer to the SmartStart website (http://www.hp.com/servers/smartstart) to be sure that you are using the latest version of SmartStart. For more information, refer to the documentation provided with the SmartStart CD.

If you do not use the SmartStart CD to install an operating system, drivers for some of the new hardware are required. These drivers, as well as other option drivers, ROM images, and value-add software can be downloaded from the HP website (http://www.hp.com/support).

> **IMPORTANT:** Always perform a backup before installing or updating device drivers.

Resource Paqs

Resource Paqs are operating system-specific packages of tools, utilities, and information for HP servers running certain Microsoft® or Novell operating systems. The Resource Paqs include utilities to monitor performance, software drivers, customer support information, and white papers on the latest server integration information. Refer to the Enterprise Partnerships website (http://h18000.www1.hp.com/partners), select **Microsoft** or **Novell**, depending on the operating system, and follow the link to the appropriate Resource Paq.

ProLiant Support Packs

PSPs represent operating system-specific bundles of ProLiant optimized drivers, utilities, and management agents. Refer to the PSP website (http://h18000.www1.hp.com/products/servers/management/psp.html).

Operating system version support

Refer to the operating system support matrix (http://www.hp.com/go/supportos).

Change control and proactive notification

HP offers Change Control and Proactive Notification to notify customers 30 to 60 days in advance of upcoming hardware and software changes on HP commercial products.

For more information, refer to the HP website (http://h18023.www1.hp.com/solutions/pcsolutions/pcn.html).

Natural language search assistant

The natural language search assistant (http://askq.compaq.com) is a search engine that finds information on HP products, including ProLiant servers. The search engine responds to queries entered in question form.

Care Pack

HP Care Pack Services offer upgraded service levels to extend and expand standard product warranty with easy-to-buy, easy-to-use support packages that help you make the most of your server investments. Refer to the Care Pack website (http://www.hp.com/hps/carepack/servers/cp_proliant.html).

Battery replacement

If the server no longer automatically displays the correct date and time, you may need to replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.

WARNING: The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:

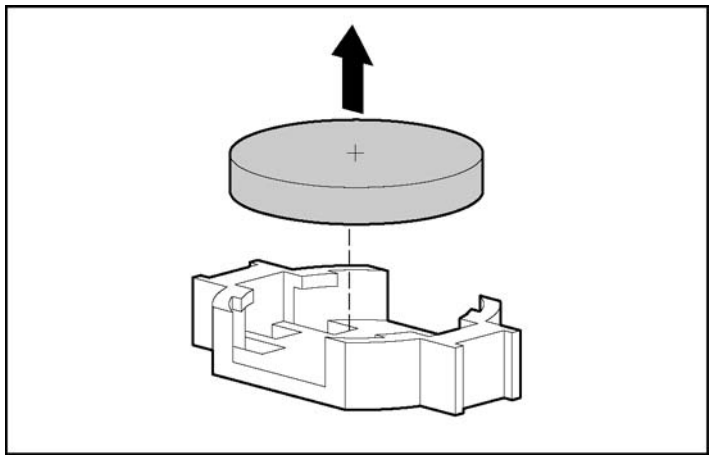
- **Do not attempt to recharge the battery.**
- **Do not expose the battery to temperatures higher than 60°C (140°F).**
- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**
- **Replace only with the spare designated for this product.**

To remove the component:

1. Power down the server ("Powering down the server" on page 35).
2. Extend or remove the server from the rack ("Extending the server from the rack" on page 37).
3. Remove the access panel.
4. Remove the PCI riser cage ("Removing the PCI riser cage" on page 40).

CAUTION: To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.

5. Remove the battery.



IMPORTANT: Replacing the system board battery resets the system ROM to its default configuration. After replacing the battery, reconfigure the system through RBSU.

To replace the component, reverse the removal procedure.

For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

Troubleshooting

In this section

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Server diagnostic steps....125
Important safety information....126
Preparing the server for diagnosis....130
Symptom information....130
Service notifications....131
Loose connections....131
Diagnostic steps....132
POST error messages and beep codes....148

Troubleshooting resources

The *HP ProLiant Servers Troubleshooting Guide* provides simple procedures for resolving common problems as well as a comprehensive course of action for fault isolation and identification, error message interpretation, issue resolution, and software maintenance.

To obtain the guide, refer to any of the following sources and then select the *HP ProLiant Servers Troubleshooting Guide.*

- The server-specific Documentation CD
- The Business Support Center on the HP website (http://www.hp.com/support). You can find the guide by using the navigation features on the HP website.
- The Technical Documentation website (http://www.docs.hp.com). Select **Enterprise Servers, Workstations and Systems Hardware,** and then the appropriate server.

Server diagnostic steps

This section covers the steps to take in order to diagnose a problem quickly.

To effectively troubleshoot a problem, HP recommends that you start with the first flowchart in this section, "Start diagnosis flowchart (on page 132)," and follow the appropriate diagnostic path. If the other flowcharts do not provide a troubleshooting solution, follow the diagnostic steps in "General diagnosis flowchart (on page 134)." The General diagnosis flowchart is a generic troubleshooting process to be used when the problem is not server-specific or is not easily categorized into the other flowcharts.

IMPORTANT: This guide provides information for multiple servers. Some information may not apply to the server you are troubleshooting. Refer to the server documentation for information on procedures, hardware options, software tools, and operating systems supported by the server.

WARNING: To avoid potential problems, ALWAYS read the warnings and cautionary information in the server documentation before removing, replacing, reseating, or modifying system components.

Important safety information

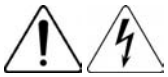
Familiarize yourself with the safety information in the following sections before troubleshooting the server.

Important safety information

Before servicing this product, read the *Important Safety Information* document provided with the server.

Symbols on equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions.



This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

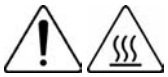
WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.

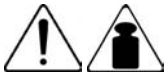
This symbol on an RJ-45 receptacle indicates a network interface connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.



20.41 - 27.22 kg

47.18 - 60.0 lb

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

Warnings and cautions

WARNING: Only authorized technicians trained by HP should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- **The leveling feet are extended to the floor.**
- **The full weight of the rack rests on the leveling feet.**
- **The stabilizing feet are attached to the rack if it is a single-rack installation.**
- **The racks are coupled together in multiple-rack installations.**
- **Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.**

WARNING: To reduce the risk of electric shock or damage to the equipment:

- **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**
- **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**
- **Unplug the power cord from the power supply to disconnect power to the equipment.**
- **Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.**

20.41 - 27.22 kg

47.18 - 60.0 lb

WARNING: To reduce the risk of personal injury or damage to the equipment:

- **Observe local occupation health and safety requirements and guidelines for manual handling.**
- **Obtain adequate assistance to lift and stabilize the chassis during installation or removal.**
- **The server is unstable when not fastened to the rails.**
- **When mounting the server in a rack, remove the power supplies and any other removable module to reduce the overall weight of the product.**

CAUTION: To properly ventilate the system, you must provide at least 7.6 cm (3.0 in) of clearance at the front and back of the server.

CAUTION: The server is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

Preparing the server for diagnosis

1. Be sure the server is in the proper operating environment with adequate power, air conditioning, and humidity control. Refer to the server documentation for required environmental conditions.
2. Record any error messages displayed by the system.
3. Remove all diskettes and CDs from the media drives.
4. Power down the server and peripheral devices if you will be diagnosing the server offline. Always perform an orderly shutdown, if possible. This means you must:
   a. Exit any applications.
   b. Exit the operating system.
   c. Power down the server ("Powering down the server" on page 35).
5. Disconnect any peripheral devices not required for testing (any devices not necessary to power up the server). Do not disconnect the printer if you want to use it to print error messages.
6. Collect all tools and utilities, such as a Torx screwdriver, loopback adapters, ESD wrist strap, and software utilities, necessary to troubleshoot the problem.
   – You must have the appropriate Health Drivers and Management Agents installed on the server.

     NOTE: To verify the server configuration, connect to the System Management homepage and select **Version Control Agent**. The VCA gives you a list of names and versions of all installed HP drivers, Management Agents, and utilities, and whether they are up to date.

   – HP recommends you have access to the SmartStart CD for value-added software and drivers required during the troubleshooting process.
   – HP recommends you have access to the server documentation for server-specific information.

Symptom information

Before troubleshooting a server problem, collect the following information:

- What events preceded the failure? After which steps does the problem occur?
- What has been changed between the time the server was working and now?
- Did you recently add or remove hardware or software? If so, did you remember to change the appropriate settings in the server setup utility, if necessary?
- Has the server exhibited problem symptoms for a period of time?
- If the problem occurs randomly, what is the duration or frequency?

To answer these questions, the following information may be useful:

- Run HP Insight Diagnostics (on page 118) and use the survey page to view the current configuration or to compare it to previous configurations.
- Refer to your hardware and software records for information.

Service notifications

To find out the latest service notifications, refer to the HP website (http://www.hp.com/products/servers/platforms). Select the appropriate server model, and then click the **Documentation** link on the product page.

Loose connections

Action:

- Be sure all power cords are securely connected.
- Be sure all cables are properly aligned and securely connected for all external and internal components.
- Remove and check all data and power cables for damage. Be sure no cables have bent pins or damaged connectors.
- If a fixed cable tray is available for the server, be sure the cords and cables connected to the server are correctly routed through the tray.
- Be sure each device is properly seated.
- If a device has latches, be sure they are completely closed and locked.

- Check any interlock or interconnect LEDs that may indicate a component is not connected properly.
- If problems continue to occur, remove and reinstall each device, checking the connectors and sockets for bent pins or other damage.

Diagnostic steps

To effectively troubleshoot a problem, HP recommends that you start with the first flowchart in this section, "Start diagnosis flowchart (on page 132)," and follow the appropriate diagnostic path. If the other flowcharts do not provide a troubleshooting solution, follow the diagnostic steps in "General diagnosis flowchart (on page 134)." The General diagnosis flowchart is a generic troubleshooting process to be used when the problem is not server-specific or is not easily categorized into the other flowcharts.

The available flowcharts include:

- Start diagnosis flowchart (on page 132)
- General diagnosis flowchart (on page 134)
- Power-on problems flowchart (on page 136)
- POST problems flowchart (on page 139)
- OS boot problems flowchart (on page 142)
- Server fault indications flowchart (on page 145)

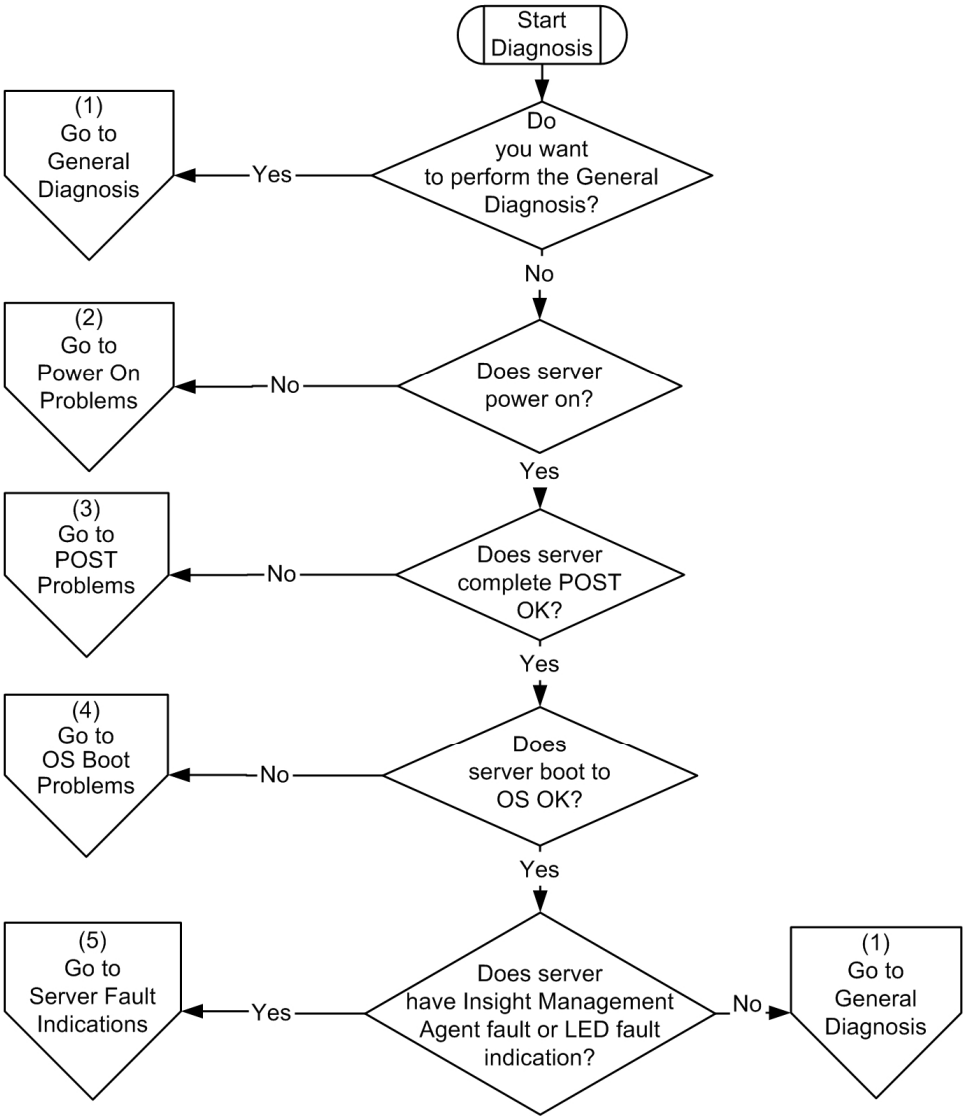
The number contained in parentheses in the flowchart boxes corresponds to a table with references to other detailed documents or troubleshooting instructions.

Start diagnosis flowchart

Use the following flowchart to start the diagnostic process.

Item	Refer to
1	"General diagnosis flowchart (on page 134)"
2	"Power-on problems flowchart (on page 136)"

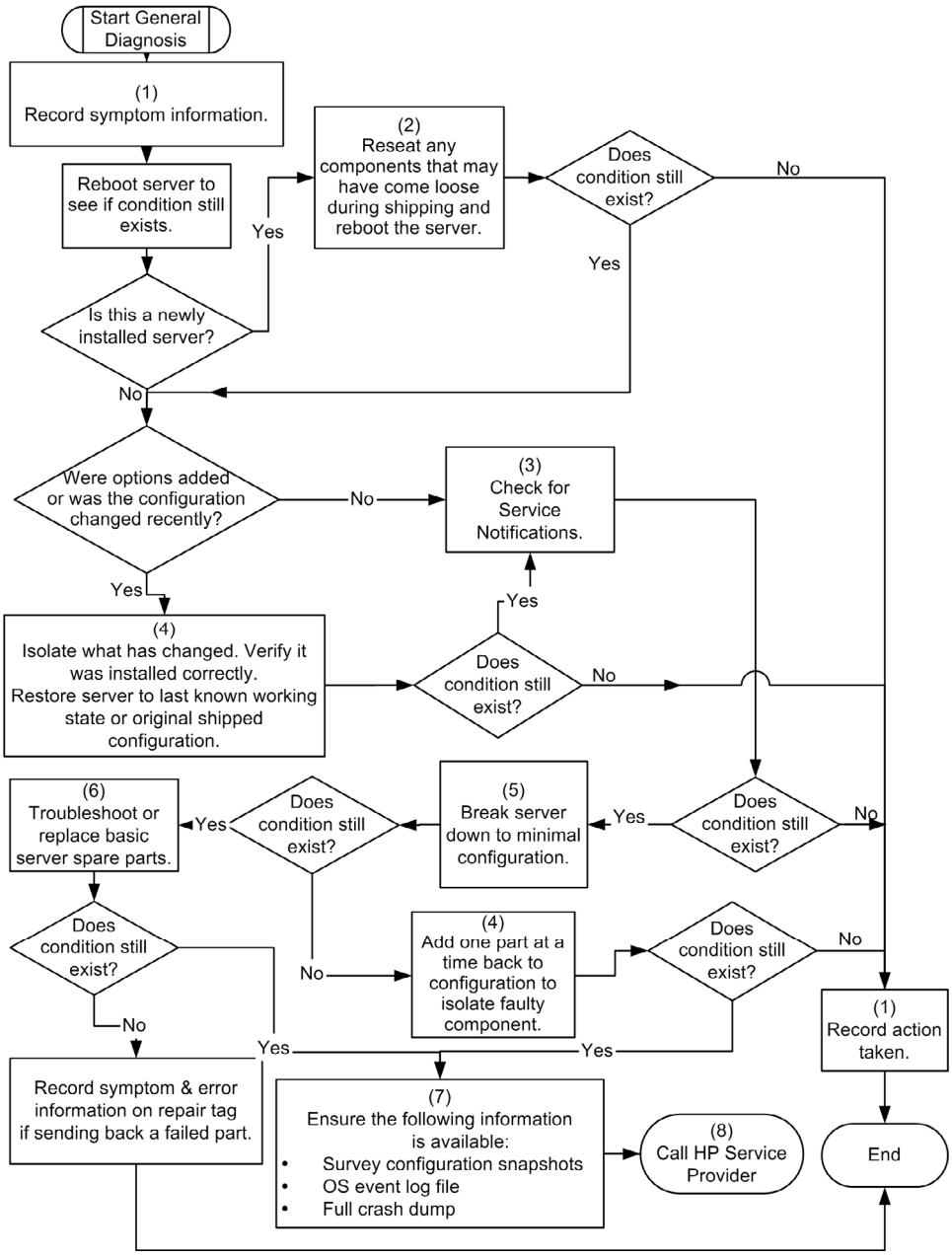
Item	Refer to
3	"POST problems flowchart (on page 139)"
4	"OS boot problems flowchart (on page 142)"
5	"Server fault indications flowchart (on page 145)"



General diagnosis flowchart

The General diagnosis flowchart provides a generic approach to troubleshooting. If you are unsure of the problem, or if the other flowcharts do not fix the problem, use the following flowchart.

Item	Refer to
1	"Symptom information (on page 130)"
2	"Loose connections (on page 131)"
3	"Service notifications (on page 131)"
4	Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
5	Server user guide or setup and installation guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
6	• Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms) • "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
7	• "Server information you need" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • "Operating system information you need" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
8	"Contacting HP technical support or an authorized reseller" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).


Start General Diagnosis
(1) Record symptom information.
Reboot server to see if condition still exists.
Yes
(2) Reseat any components that may have come loose during shipping and reboot the server.
Does condition still exist?
No
Yes
Is this a newly installed server?
No
Were options added or was the configuration changed recently?
No
(3) Check for Service Notifications.
Yes
(4) Isolate what has changed. Verify it was installed correctly. Restore server to last known working state or original shipped configuration.
Does condition still exist?
Yes
No
(6) Troubleshoot or replace basic server spare parts.
Yes
Does condition still exist?
(5) Break server down to minimal configuration.
Yes
Does condition still exist?
No
Does condition still exist?
No
(4) Add one part at a time back to configuration to isolate faulty component.
Does condition still exist?
No
(1) Record action taken.
No
Yes
Yes
Record symptom & error information on repair tag if sending back a failed part.
(7) Ensure the following information is available:
• Survey configuration snapshots
• OS event log file
• Full crash dump
(8) Call HP Service Provider
End

Power-on problems flowchart

Symptoms:

- The server does not power on.
- The system power LED is off or amber.
- The external health LED is red or amber.
- The internal health LED is red or amber.

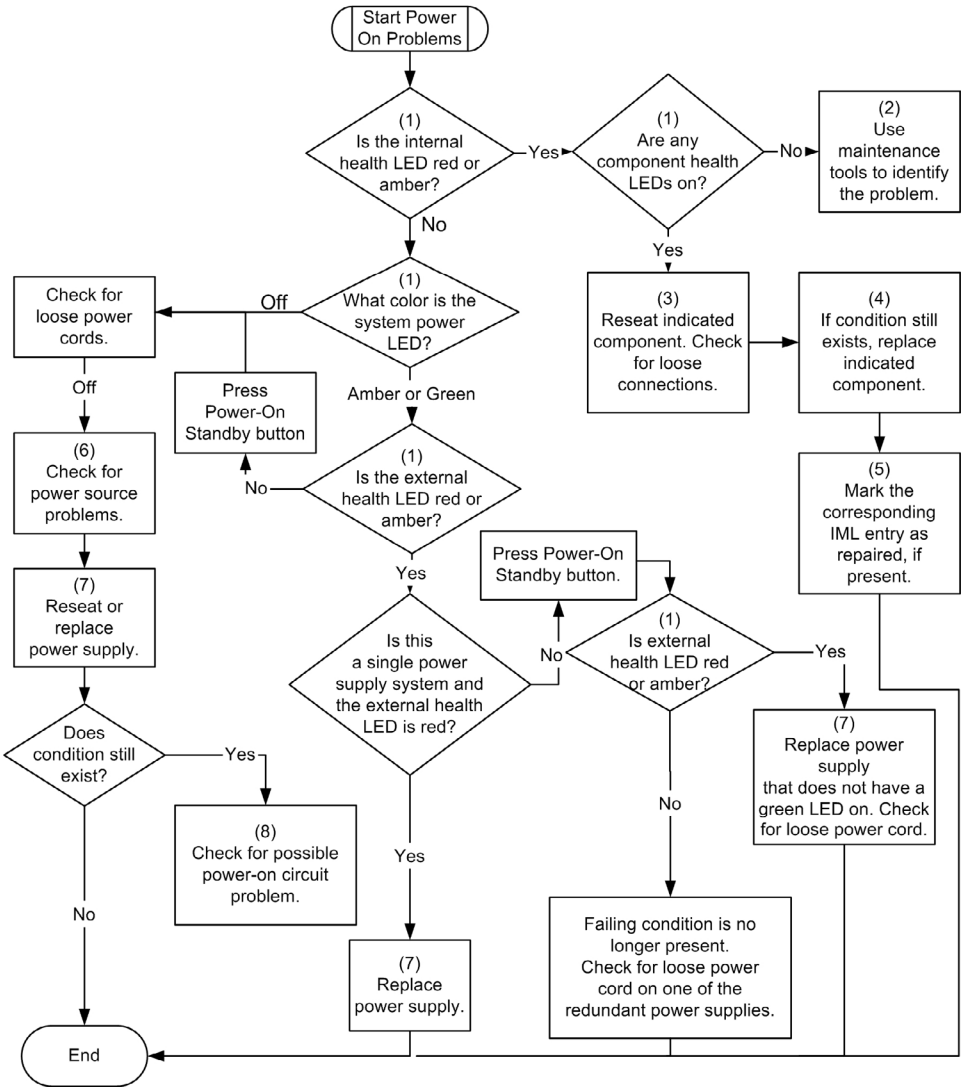
NOTE: For the location of server LEDs and information on their statuses, refer to the server documentation.

Possible causes:

- Improperly seated or faulty power supply
- Loose or faulty power cord
- Power source problem
- Power on circuit problem
- Improperly seated component or interlock problem
- Faulty internal component

Item	Refer to
1	Server user guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms).
2	"HP Insight Diagnostics (on page 118)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
3	"Loose connections (on page 131)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
4	Server maintenance and service guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)

Item	Refer to
5	"Integrated Management Log ("Power-on problems flowchart" on page 136)" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
6	"Power source problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
7	• "Power supply problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)
8	"System open circuits and short circuits" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).


Start Power On Problems
(1) Is the internal health LED red or amber?
Yes
(1) Are any component health LEDs on?
No
(2) Use maintenance tools to identify the problem.
Yes
(3) Reseat indicated component. Check for loose connections.
(4) If condition still exists, replace indicated component.
(5) Mark the corresponding IML entry as repaired, if present.
No
(1) What color is the system power LED?
Off
Check for loose power cords.
Off
(6) Check for power source problems.
(7) Reseat or replace power supply.
Does condition still exist?
Yes
(8) Check for possible power-on circuit problem.
No
Press Power-On Standby button
Amber or Green
(1) Is the external health LED red or amber?
No
Yes
Is this a single power supply system and the external health LED is red?
No
Press Power-On Standby button.
(1) Is external health LED red or amber?
Yes
(7) Replace power supply that does not have a green LED on. Check for loose power cord.
No
Failing condition is no longer present. Check for loose power cord on one of the redundant power supplies.
Yes
(7) Replace power supply.
End

POST problems flowchart

Symptoms:

- Server does not complete POST

  NOTE: The server has completed POST when the system attempts to access the boot device.

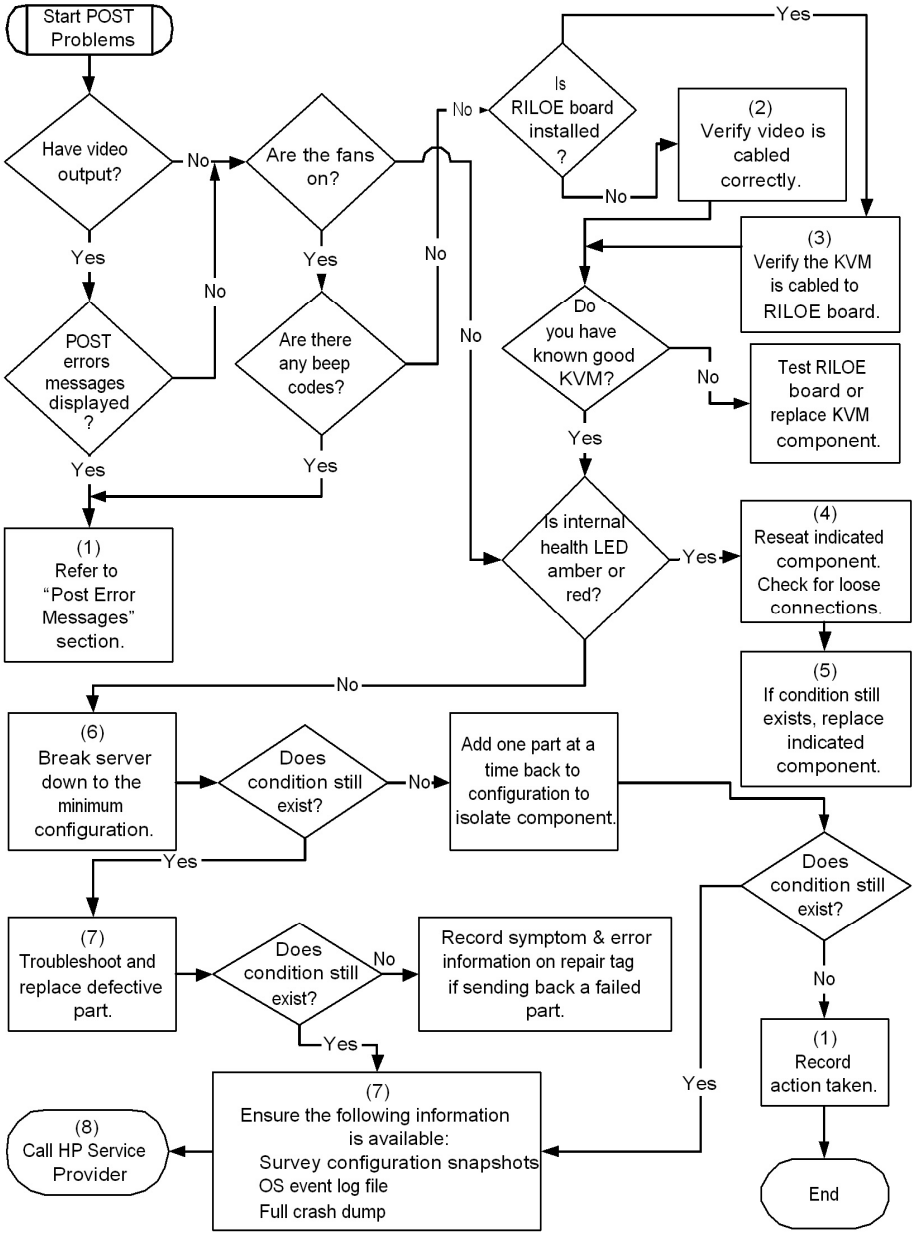
- Server completes POST with errors

Possible Problems:

- Improperly seated or faulty internal component
- Faulty KVM device
- Faulty video device

Item	Refer to
1	"POST error messages ("POST error messages and beep codes" on page 148)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
2	"Video problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
3	KVM or RILOE documentation
4	"Loose connections (on page 131)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
5	Server maintenance and service guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)
6	Server user guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)

Item	Refer to
7	• "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)


Start POST Problems
Have video output?
No
Are the fans on?
No
Is RILOE board installed ?
Yes
No
(2) Verify video is cabled correctly.
(3) Verify the KVM is cabled to RILOE board.
Yes
Yes
No
No
POST errors messages displayed ?
Are there any beep codes?
No
Do you have known good KVM?
No
Test RILOE board or replace KVM component.
Yes
Yes
Yes
Yes
(1) Refer to "Post Error Messages" section.
Is internal health LED amber or red?
Yes
(4) Reseat indicated component. Check for loose connections.
(5) If condition still exists, replace indicated component.
No
(6) Break server down to the minimum configuration.
Does condition still exist?
No
Add one part at a time back to configuration to isolate component.
Yes
Does condition still exist?
(7) Troubleshoot and replace defective part.
Does condition still exist?
No
Record symptom & error information on repair tag if sending back a failed part.
No
(1) Record action taken.
Yes
Yes
(7) Ensure the following information is available:
Survey configuration snapshots
OS event log file
Full crash dump
(8) Call HP Service Provider
End

OS boot problems flowchart

Symptoms:

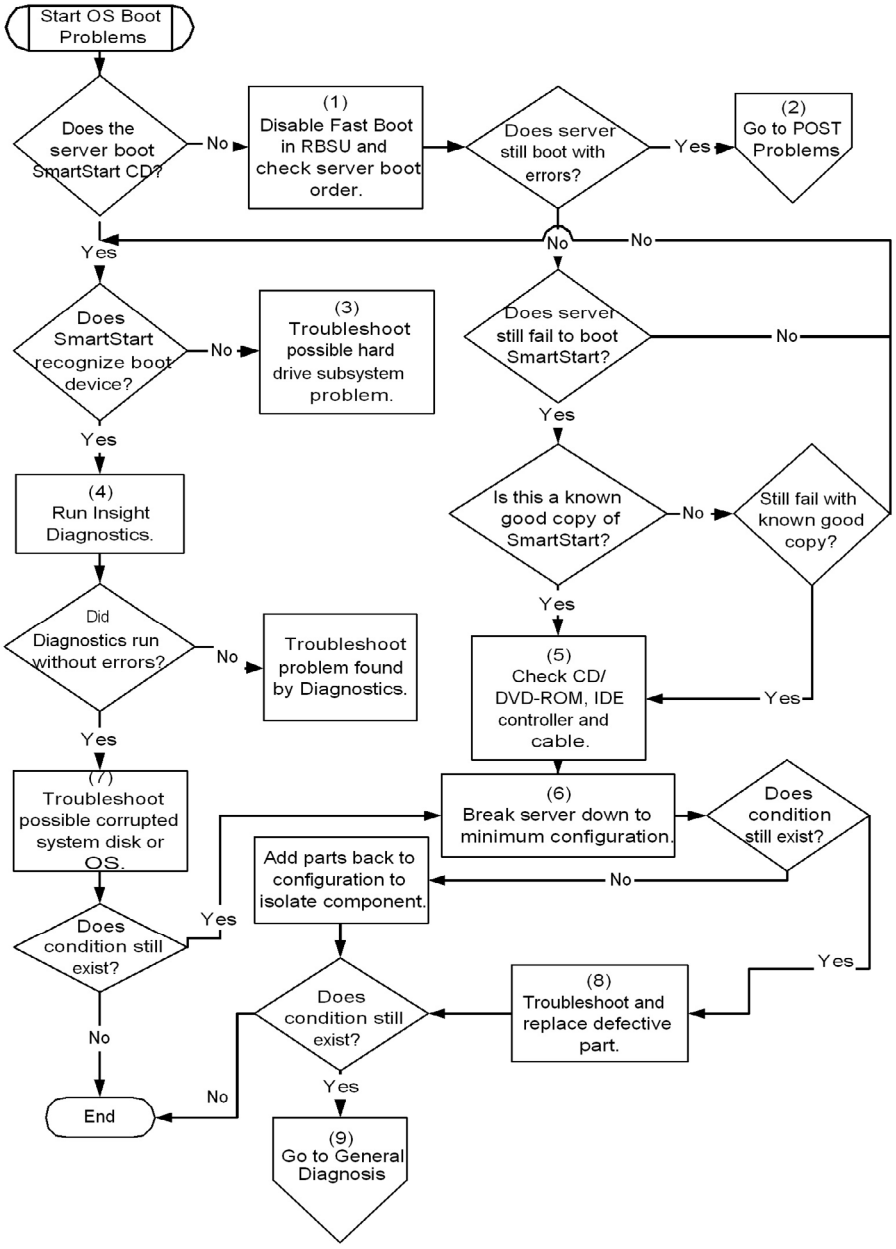
- Server does not boot a previously installed OS
- Server does not boot SmartStart

Possible Causes:

- Corrupted OS
- Hard drive subsystem problem

Item	Refer to
1	*HP ROM-Based Setup Utility User Guide* (http://www.hp.com/servers/smartstart)
2	"POST problems ("POST problems flowchart" on page 139)" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
3	• "Hard drive problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Controller documentation
4	"HP Insight Diagnostics (on page 118)"
5	• "Loose connections (on page 131)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • "CD-ROM and DVD drive problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Controller documentation
6	Server user guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)

Item	Refer to
7	• "Operating system problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • "Contacting HP technical support or an authorized reseller" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
8	• "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)
9	"General diagnosis flowchart (on page 134)"


Start OS Boot Problems
Does the server boot SmartStart CD?
No
(1) Disable Fast Boot in RBSU and check server boot order.
Does server still boot with errors?
Yes
(2) Go to POST Problems
Yes
No
No
Does SmartStart recognize boot device?
No
(3) Troubleshoot possible hard drive subsystem problem.
Does server still fail to boot SmartStart?
No
Yes
Yes
(4) Run Insight Diagnostics.
Is this a known good copy of SmartStart?
No
Still fail with known good copy?
Did Diagnostics run without errors?
No
Troubleshoot problem found by Diagnostics.
Yes
(5) Check CD/ DVD-ROM, IDE controller and cable.
Yes
Yes
(7) Troubleshoot possible corrupted system disk or OS.
(6) Break server down to minimum configuration.
Does condition still exist?
Add parts back to configuration to isolate component.
No
Yes
Does condition still exist?
Yes
No
(8) Troubleshoot and replace defective part.
Does condition still exist?
No
Yes
End
(9) Go to General Diagnosis

Server fault indications flowchart

Symptoms:

- Server boots, but a fault event is reported by Insight Management Agents (on page 113)
- Server boots, but the internal health LED or external health LED is red or amber

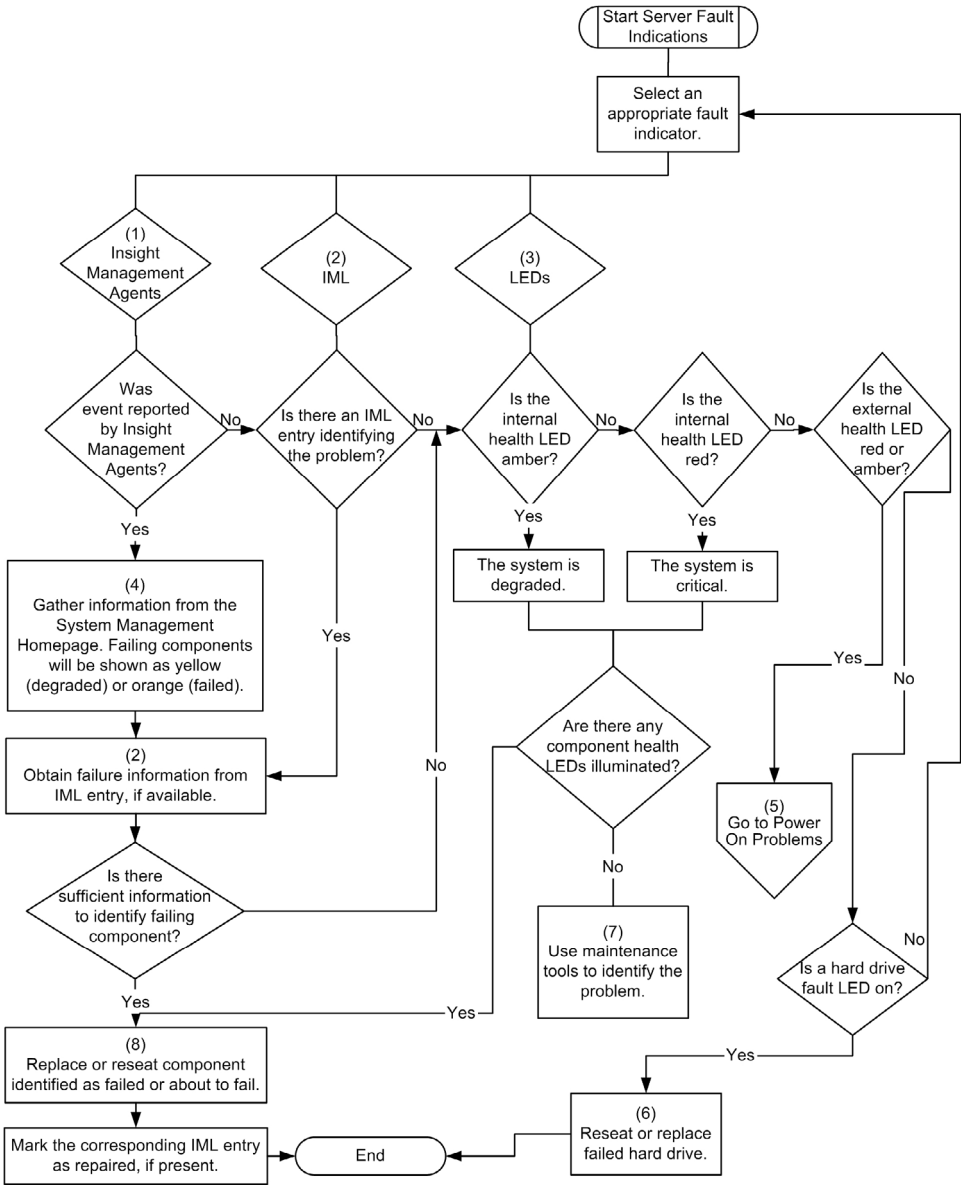
  NOTE: For the location of server LEDs and information on their statuses, refer to the server documentation.

Possible causes:

- Improperly seated or faulty internal or external component
- Unsupported component installed
- Redundancy failure
- System overtemperature condition

Item	Refer to
1	"Management Agents (on page 113)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
2	• "Integrated Management Log ("Power-on problems flowchart" on page 136)" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • "Event List Error Messages" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
3	Server user guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)
4	System Management Homepage at https://localhost:2381 (https://localhost:2381)
5	"Power-On Problems ("Power-on problems flowchart" on page 136)"

Item	Refer to
6	• "Hard Drive Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)
7	"HP Insight Diagnostics (on page 118)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
8	• "Hardware Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)


Start Server Fault Indications
Select an appropriate fault indicator.
(1) Insight Management Agents
(2) IML
(3) LEDs
Was event reported by Insight Management Agents?
No
Is there an IML entry identifying the problem?
No
Is the internal health LED amber?
No
Is the internal health LED red?
No
Is the external health LED red or amber?
Yes
Yes
Yes
Yes
Yes
The system is degraded.
The system is critical.
(4) Gather information from the System Management Homepage. Failing components will be shown as yellow (degraded) or orange (failed).
(2) Obtain failure information from IML entry, if available.
Is there sufficient information to identify failing component?
No
Yes
Are there any component health LEDs illuminated?
No
Yes
(5) Go to Power On Problems
(7) Use maintenance tools to identify the problem.
Is a hard drive fault LED on?
No
Yes
(8) Replace or reseat component identified as failed or about to fail.
Mark the corresponding IML entry as repaired, if present.
End
(6) Reseat or replace failed hard drive.

POST error messages and beep codes

List of messages:

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Introduction to POST error messages

The error messages and codes in this section include all messages generated by ProLiant servers. Some messages are informational only and do not indicate an error. A server generates only the codes that are applicable to its configuration and options.

The following POST messages are new. For a complete listing of error messages, refer to the POST messages in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).

WARNING: To avoid potential problems, ALWAYS read the warnings and cautionary information in the server documentation before removing, replacing, reseating, or modifying system components.

Invalid memory types were found on the same node. Please check DIMM compatibility. - Some DIMMs may not be used

Description: Invalid or mixed memory types were detected during POST.

Action: Use only supported DIMM pairs when populating memory sockets. Refer to the applicable server user guide memory requirements.

Node Interleaving disabled - Invalid memory configuration

Description: Each node must have the same memory configuration to enable interleaving.

Action: Populate each node with the same memory configuration and enable interleaving in RBSU.

Processor Reduced Power Mode Enabled in RBSU

Description: Processors clocked down

Action: If you select the reduced power mode in RBSU, the processor are displayed as their reduced speed during POST. This message indicates that the RBSU reduced power mode has been enabled and also indicates the maximum speed for the installed processors.

Processor Not Started (Processor Stalled)

Description: If processor fails to launch or fails after being launched but before completing its initialization, the processor is not started and this message is displayed. This is likely a defective processor.

Processor Not Started (Stepping Does Not Match)

Description: If a processor has a stepping different than the bootstrap processor, the processor is not started, and this message is displayed.

Processor Not Started (Unsupported Processor Stepping)

Description: If a processor has an unsupported stepping, it is not started, and this message is displayed.

Processor Not Supported (Unsupported Core Speed)

Description: If a processor has a core speed that is incompatible with the other installed processors, the processor is not started, and this message is displayed.

There must be a first DIMM in pair if second DIMM in pair is populated. Second DIMM in pair ignored.

Description: The first DIMM socket in the pair is not populated. The second DIMM in the pair is not recognized or used.

Action: Populate the DIMM socket.

Unsupported DIMM(s) found in system. - DIMM(s) may not be used

Description: Unsupported memory types found in system.

Action: Refer to the applicable server user guide memory requirements and replace with supported DIMMs.

Unsupported PCI Card Detected Remove PCI Card from Slot

Audible Beeps: 2 short

Possible Cause: The PCI card installed in the slot referenced in the message is strictly not supported on this system.

Action: Remove the card from the slot reported in the message.

Unsupported Processor Configuration (Processor Required in Slot #1)

Description: Processor required in slot 1.

Action: If you do not install a supported processor in slot 1, this message is displayed, and the system halts.

Warning - Mixed Feature Processors Were Detected

Description: Mixed feature processors were detected. The server will boot using the lowest featured processor.

If you install supported processors with different features in the same system, this informational message is displayed.

WARNING - Resetting Corrupted CMOS

Description: This informational message displays when the ROM detects that CMOS is corrupted. The default values are restored. This message does not display if a user has intentionally invalidated the configuration through RBSU by erasing NVRAM.

WARNING - Resetting Corrupted NVRAM

Description: This informational message displays when the ROM detects that NVRAM is corrupted. The default values are restored. This message does not display if a user has intentionally invalidated the configuration through RBSU by erasing NVRAM.

WARNING - Resetting Corrupted System Environment

Description: This informational message is displayed when the System Environment Variables are corrupted. The default values are restored. This message does not display if a user has intentionally invalidated the configuration through RBSU by erasing NVRAM.

WARNING - Restoring Default Configurations as Requested

Description: If, on the subsequent power up, you select the option to erase NVRAM in RBSU, this informational message is displayed.

207 - Invalid Memory Configuration Detected. DIMMs installed when no corresponding processor is detected.

Description: Processor is required to be installed for memory to be used.

Action: Populate the processor socket or remove the DIMM.

Electrostatic discharge

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Grounding methods to prevent electrostatic discharge.....154

Preventing electrostatic discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding methods to prevent electrostatic discharge

Several methods are used for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ±10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact an authorized reseller.

Regulatory compliance notices

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Federal Communications Commission notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (for example, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

FCC rating label

The FCC rating label on the device shows the classification (A or B) of the equipment. Class B devices have an FCC logo or ID on the label. Class A devices do not have an FCC logo or ID on the label. After you determine the class of the device, refer to the corresponding statement.

Class A equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Class B equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit that is different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Declaration of conformity for products marked with the FCC logo, United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding this product, contact us by mail or telephone:

- Hewlett-Packard Company
  P. O. Box 692000, Mail Stop 530113
  Houston, Texas 77269-2000
- 1-800-HP-INVENT (1-800-474-6836). (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company
  P. O. Box 692000, Mail Stop 510101
  Houston, Texas 77269-2000
- 1-281-514-3333

To identify this product, refer to the part, series, or model number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Laser compliance

This product may be provided with an optical storage device (that is, CD or DVD drive) and/or fiber optic transceiver. Each of these devices contains a laser that is classified as a Class 1 Laser Product in accordance with US FDA regulations and the IEC 60825-1. The product does not emit hazardous laser radiation.

WARNING: Use of controls or adjustments or performance of procedures other than those specified herein or in the laser product's installation guide may result in hazardous radiation exposure. To reduce the risk of exposure to hazardous radiation:

- **Do not try to open the module enclosure. There are no user-serviceable components inside.**
- **Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.**
- **Allow only HP Authorized Service technicians to repair the unit.**

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

Canadian notice (Avis Canadien)

Class A equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union regulatory notice

This product complies with the following EU Directives:

- Low Voltage Directive 73/23/EEC
- EMC Directive 89/336/EEC

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) which are listed on the EU Declaration of Conformity issued by Hewlett-Packard for this product or product family.

This compliance is indicated by the following conformity marking placed on the product:

This marking is valid for non-Telecom products and EU harmonized Telecom products (e.g. Bluetooth).

This marking is valid for EU non-harmonized Telecom products.

*Notified body number (used only if applicable—refer to the product label)

Japanese notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です　この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

BSMI notice

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Korean notice A&B

Class A equipment

A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약 잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Class B equipment

B급 기기 (가정용 정보통신기기)

이 기기는 가정용으로 전자파적합등록을 한 기기로서 주거지역에서는 물론 모든지역에서 사용할 수 있습니다.

Battery replacement notice

WARNING: The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:

- **Do not attempt to recharge the battery.**
- **Do not expose the battery to temperatures higher than 60°C (140°F).**
- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**

Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to HP, an authorized HP Partner, or their agents.

For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

Taiwan battery recycling notice

The Taiwan EPA requires dry battery manufacturing or importing firms in accordance with Article 15 of the Waste Disposal Act to indicate the recovery marks on the batteries used in sales, giveaway or promotion. Contact a qualified Taiwanese recycler for proper battery disposal.

Power cord statement for Japan

製品には、同梱された電源コードをお使い下さい。
同梱された電源コードは、他の製品では使用出来ません。

Server specifications

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Server specifications

Dimensions	
Height	8.59 cm (3.38 in)
Depth	66.07 cm (26.01 in)
Width	44.54 cm (17.54 in)
Weight (maximum)	27.22 kg (60 lb)
Weight (no drives installed)	20.41 kg (47.18 lb)
Input requirements	
Rated input voltage	100 - 132 VAC, 200 - 240 VAC
Rated input frequency	50 Hz to 60 Hz
Rated input current	7.5 A (100 VAC), 3.8 A (200 VAC)
Rated input power	735 W
BTUs per hour	2508
Power supply output	
Rated steady-state power	575 W
Maximum peak power	575 W

Environmental specifications

Temperature range*	
Operating	10°C to 35°C (50°F to 95°F)
Shipping	-30°C to 50°C (-22°F to 122°F)
Storage	-40°C to 70°C (-40°F to 158°F)
Maximum wet bulb temperature	28°C (82.4°F)
Relative humidity (noncondensing)**	
Operating	10% to 90%
Non-operating	5% to 95%

* All temperature ratings shown are for sea level. An altitude derating of 1°C per 300 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed.

** Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.

Technical support

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Related documents

For related documentation, refer to the Documentation CD.

Before you contact HP

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP contact information

For the name of the nearest HP authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.

- In other locations, refer to the HP website (http://www.hp.com).

For HP technical support:

- In North America:
  - Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
  - If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to the HP website (http://www.hp.com).
- Outside North America, call the nearest HP Technical Support Phone Center. For telephone numbers for worldwide Technical Support Centers, refer to the HP website (http://www.hp.com).

Customer self repair

What is customer self repair?

HP's customer self-repair program offers you the fastest service under either warranty or contract. It enables HP to ship replacement parts directly to you so that you can replace them. Using this program, you can replace parts at your own convenience.

A convenient, easy-to-use program:

- An HP support specialist will diagnose and assess whether a replacement part is required to address a system problem. The specialist will also determine whether you can replace the part.
- For specific information about customer replaceable parts, refer to the maintenance and service guide on the HP website (http://www.hp.com/support).

Acronyms and abbreviations

ABEND

abnormal end

ACU

Array Configuration Utility

ASR

Automatic Server Recovery

BBWC

battery-backed write cache

CPU

central processing unit

DDR

double data rate

DIMM

dual inline memory module

ECC

error checking and correcting

IEC

International Electrotechnical Commission

iLO

Integrated Lights-Out

IML

Integrated Management Log

IPL

initial program load

IRQ

interrupt request

MPS

multi-processor specification

NEMA

National Electrical Manufacturers Association

NFPA

National Fire Protection Association

NIC

network interface controller

NMI

non-maskable interrupt

NVRAM

non-volatile memory

ORCA

Option ROM Configuration for Arrays

PCI-X

peripheral component interconnect extended

PDU

power distribution unit

POST

Power-On Self Test

PPM

Processor Power Module

PSP

ProLiant Support Pack

PXE

preboot eXecution environment

RBSU

ROM-Based Setup Utility

RILOE II

Remote Insight Lights-Out Edition II

SAS

serial attached SCSI

SATA

serial ATA

SDRAM

synchronous dynamic RAM

SIM

Systems Insight Manager

TMRA

recommended ambient operating temperature

UID

unit identification

USB

universal serial bus

WOL

Wake-on LAN

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